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THE UNIVERSITY OF ALBERTA

AN INVESTIGATION OF PUPIL UNDERSTANDING OF CONNECTIVES IN READING

by

JEAN ELIZABETH ROBERTSON

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES IN

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled:

AN INVESTIGATION OF PUPIL UNDERSTANDING OF CONNECTIVES IN READING

submitted by

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in partial fulfilment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

DISSERTATION ABSTRACT

Students in grades four, five, and six are often required to read sentences which have co-ordinate and subordinate ideas in them but very little is known about the reading problems which these sentence structures present to children. The purpose of this study, therefore, was to investigate the understanding in reading which children aged eight to twelve studying in grades four to six have of connectives, the linguistic form that connects a clause to another clause or some word in it on the printed page.

The investigation of students' reading comprehension of connectives was conducted in three sections. The first section analyzed a sample of stories from three sets of basal readers to identify the connectives present and the types of sentence structures in which they are often found. Part two consisted of the construction of a _Connectives Reading Test_, 150 multiple-choice test items designed to test the reading comprehension of students using seventeen selected connectives in some of the sentence structures of the basal readers. The seventeen connectives represented both subordinate and co-ordinate clause linkers including sentence linkers and a special class, "absent" connectives. The administration of the test and the processing of the data collected according to selected statistical techniques, constituted the third part of the study.

In addition, the construction and administration of a twenty item _Written Connectives Test_ was completed. The data collected were compared with that from the _Connectives Reading Test_ although no statistical tests were applied.

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[illegible]

After reliability and validity of the Connectives Reading Test had been established in a pilot study, the test was administered to a randomized sample of Alberta school students, stratified according to places of student residence, urban, small town, or rural areas.

The data collected were processed by statistical techniques including item analyses, the computation of correlations, analyses of variance and covariance, and factor analysis. The seven covariants were: sex, mental age as represented by student achievement on the SCAT Test, chronological age, socio-economic status rated by the Blishen Occupational Class Scale, and listening, reading, and written language abilities assessed by the appropriate STEP Tests. The twenty most difficult test items of the Connectives Reading Test were analyzed further to attempt to identify some of the possible patterns of language difficulty by indicating the incidence of selected language features in these items.

The investigation revealed that there is a significant relationship between the understanding a child has of connectives and his sex, mental age, and abilities in listening, reading, and written language. Only the variables of chronological age and socio-economic status did not significantly affect student test scores. The place of residence of the students in urban, small town or rural areas exerted a significant effect upon student test scores interacting significantly with both grade and sex factors.

The study showed also that for each grade group tested, there was an increase in the understanding of the items of the total test and of each of the seventeen connectives, from a lower to a higher grade. The

same progression in understanding was shown in the Written Connectives Test. It was evident, too, from the investigation that the rate of development of understanding varied for items testing each of the seventeen connectives.

Within each grade at least five achievement groups were indentified whose group means on the Connectives Reading Test differed significantly one from the other. The development of understanding of connectives from each one of these groups from a lower to a higher grade level was identified.

The study revealed that there was a consistent relationship between the development of student understanding of a connective in reading and the pattern of his errors on the items testing that connective. Answers which contained grammatical errors were made most often by the students while those answers predicated on wrong connectives were next in frequency. Errors involving incorrect situations were made the least.

Among the general findings of the study it was noted that by connective class, comprehension problems appear to focus on the test items containing sentence linkers. Of the seventeen individual connectives studied, student comprehension of the items testing six connectives, "however, thus, which, although, and, yet" were below the comprehension level of the total student group on all test items.

The investigation indicated that the language features of the printed page which are rare in children's oral language may be those which often characterize the most difficult test items for children to read.

Children studying in the upper elementary schools in Alberta have not reached a plateau of understanding of connectives in reading. To aid their development of understanding in reading the need for specific teaching in this area is indicated from the study.

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The writer wishes to acknowledge the help and encouragement accorded her during the conduct of this investigation. Grateful appreciation is especially extended to Dr. Marion D. Jenkinson, the chairman of my committee, for the guidance and leadership she gave. Her counsel and direction have been invaluable.

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Testing was done in Edmonton School District No. 7, the County of Leduc No. 25, and in Red Deer School District No. 104. The assistance and cooperation of the administrative personnel, teachers, and children are gratefully acknowledged.

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CHAPTER I

INTRODUCTION

People use oral language as the basis of communication in our society. As children advance from grade to grade in school, however, they find that the language they write and read also becomes important to their success in our system of education. To a marked degree their ability to read well particularly determines the academic level they achieve in their studies. As oral language is basic and primary, the characteristics of spoken English are also those of written material which is read. In addition, because the two communication media are different, each has its own unique qualities. Reading, then, requires students to use their knowledge of both oral and written language in the auditory-visual association of sounds with symbols to identify words and language structures on the printed page.

One characteristic of languages which challenges the speaker of English is the nesting of a sentence structure within another one. For example, the communication of an idea may necessitate the use of a second clause as a part of the structure of the first clause. Ideas may be conjoined also, but whether the clauses are nested or conjoined the association of ideas is partially through the connectives which introduce them. To understand the nature of the association of these ideas, an understanding of the connectives is required.

Some words sound alike in English but have different lexical meanings and/or syntactic classifications. A number of clausal connectives are homophonic in nature and in addition, may have a variety of meanings making it more difficult to fully understand the message being spoken. The association of ideas in English, therefore, by nesting or conjoining, the multi-functions of homophones, and the multi-meanings of connectives are features of languages with which every speaker of English must contend.

The characteristics of the oral language are transferred to the written English language where all the problems of their imperfect graphic representation further complicate the association of ideas using connectives. Because of the comparative conservatism of the printing conventions, changes in oral language have not always been reflected in print. By tradition, a formal language has gradually developed for the printed word which consistently uses structures of language less frequently heard in speech. The homophones which could confuse children in speech may be confusing, too, as homographs on the printed page. Variations in the spelling of words give clues as in "four" and "for" but there is no such clue for distinguishing the preposition "for" from the clausal connective "for." Differences between the printed and the oral word vary greatly from situation to situation and from person to person but children in school are confronted with them and they have to resolve any problems which may arise from these differences.

The problems of both oral and written language are inherited by students when they read what others have said. Reading is a complex process with its own unique audio-visual characteristics which make further demands upon users of English. To read and understand sentences on the printed page, readers have to manage the accumulated problems of oral language, written language, and the reading process.

Furthermore, our thinking processes influence the selection of the language structures we use, and our language structures restrict our thinking constructs. Children in school are forced to read books written by adults who very often use more mature language structures and thinking processes than those the child can understand. The problems of cognitive development, therefore, and the concomitant problems of oral and written language development pervade problems in reading, and in the reading of connectives particularly.

I. THE PROBLEM

As children in grades four, five, and six are taught, they are required to read a wide variety of materials which develop and utilize reading skills. The structural patterns of these printed materials often contain ideas which are linked co-ordinately or subordinately to other ideas by a linguistic unit called a connective. Although numbers of these sentence patterns are read daily in school, very little is known about the difficulties which they may present to pupils.

Any control over the use of these complex sentence patterns does not appear to extend beyond the first few years in school. During the primary years of the elementary school program, many educators seek to give children an opportunity to acquire an adequate reading vocabulary without the added burden of a wide variety of complex language structures. However, the extent and duration of this control varies tremendously from book to book and after the first few years in school appears to be non-existent.

Children aged eight to twelve in grades four to six are presented with an imposing array of these reading materials both in the basal developmental reading program and in the functional and recreational reading programs. Co-ordinate and subordinate ideas are presented in many structural contexts and educators concede that the language of textbooks is often difficult for their students. Although there may be many factors contributing to reading problems, one factor may be the lack of understanding of connectives.

II. THE PURPOSE OF THE STUDY

Even though there are several other ways to associate ideas in English, the use of connectives is widely utilized. The purpose of this study is to investigate the understanding in reading which children aged eight to twelve studying in grades four to six, have of connectives.

These children have often developed mentally to the place where they are beginning to formulate more abstract modes of thought and to use them in their language. It is difficult admittedly to identify the scope of the cognitive demands of each connective investigated in this study but they appear to range from concrete mental operations to more abstract mental operations. That is, some connectives may be used often in situations where children are manipulating objects and using language to express relationships among the objects while other connectives may be used more often when children are engaging in mental manoeuvres apart from any physical involvement. If there are some patterns of difficulties in the use of these connectives singly and in combination one with the other, educators may gain insights which will help them in teacher education, in the preparation of educational materials, and in the conduct of reading programs. At the present time, reading programs do not incorporate sequential lessons for the development of the understanding of these connectives. They may be necessary.

III. HYPOTHESES

Research Hypotheses

The following hypotheses were formulated from the findings of the research studies reviewed and from the thought they provoked. Each hypothesis is intended to identify some area of the problem under investigation and is applicable only to the skill of reading. Those hypotheses which will be tested by selected statistical procedures will also be phrased as null hypotheses.

1. Understanding of sentences in which children show their ability to use a connective correctly or incorrectly will be affected by:

a) sex

b) mental age

c) chronological age

d) socio-economic status

e) listening ability

f) reading ability

g) written language ability

Hypotheses two to seven depend upon the statistical control of the seven variables listed in hypothesis one.

2. Pupils develop understanding of connectives gradually. This development can be identified by a statistically significant increase in the total number of correct answers attained by the pupils from grade four, to grade five, to grade six.

3. The rate of development of student understanding of different connectives is not uniform. That is, the percentage of correct answers of the pupils from one grade to another varies with the connective.

4. There are levels of pupil understanding for a connective within each grade. These levels can be identified as student achievement groups in which the percentage of correct answers of one group is significantly different from that of another group for a connective.

5. A pupil's development of understanding of a connective in

reading will be seen by the type of error he makes as he reads. No error will indicate an understanding of the connective while a grammatical or situational error will indicate a partial understanding of that connective. A wrong connective answer will indicate no understanding.

6. The frequency of occurrence of a connective in a basal reader will affect the development of the understanding of the child for a connective in reading. The connectives occurring less frequently in the basal readers will be more common in the test items that are more difficult. That is, the test items containing these connectives will have a lower difficulty index than those with the connectives which occur more frequently in the basal readers.

7. a) The pupil's understanding of a connective is affected by the number of meanings that a connective has in its function as a connective. The connectives with multi-meanings will be found more frequently in the test items that have the lower difficulty indexes.

b) The pupil's understanding of a connective is affected by the number of homographs associated with that connective. A connective with many homographs will be found more frequently in test items that have lower difficulty indexes than a connective with no or few homographs.

<u>Null Hypotheses</u>

The corresponding null hypotheses for five of the research hypotheses are:

1. There is no significant relationship between the understanding a child has of connectives and:

a) sex

b) mental age

c) chronological age

d) socio-economic status

e) listening ability

f) reading ability

g) written language ability

2. There is no significant increase in the pupil's understanding of connectives from grade four, to five, to six.

3. There is no significant difference in the rate of development of the pupils' understanding of different connectives.

4. There is no significant variation in the pupils' understanding of a connective within each grade.

5. There is no significant relationship between the pupils' understanding of a connective and the type of errors he makes as he reads.

Of interest also in the study but not phrased in null hypotheses are a number of matters which shall be investigated as opportunities permit. Fourteen of these will be identified with all observations applying only to possible problems in reading.

The understanding a child has of connectives in the sentence may be affected by:

1. The spatial position of the connective in the sentence. Connectives which appear more frequently near the beginning or the end of the sentence may be understood before those that appear more often near the middle of the sentence.

2. a) The number of words in a sentence. The fewer words there are in a sentence, the better the student may understand the connective(s) in that test item. That is, he will either choose the correct answer or an alternative which is closer to the right answer when the connective(s) is used in a shorter sentence than when used in a longer sentence.

b) The number of words in the clause(s) containing the connective(s). The shorter the clause, the more understanding the pupil may have of the connective(s) in the sentence.

3. The use of a connective in combination with other connectives. The pupil may understand a connective or be closer to an understanding of a connective when that connective is used singly in a sentence rather than in combination with one or more other connectives in a sentence.

4. The use of direct or indirect discourse in the sentence. A pupil will understand a connective better when it is used in direct discourse than he may do when that connective is used in indirect discourse.

5. The voice of the verb, active or passive. The connective(s) of a sentence using a verb in the active voice may be

easier to understand than the connective(s) in a sentence with a verb having the passive voice.

6. The sentence format. The format of the sentence especially the question and imperative formats, may inhibit the understanding of the connective in it.

7. Negation in the sentence. The presence of words of negation (for example, not, never) in the sentence may inhibit the understanding which the child has of a connective in that sentence.

8. Clause dependency. A connective which introduces a subordinate clause (first-order dependency) may be easier for the child to understand than a connective which introduces a clause having a second clause in it or modifying it. That is, a connective in a clause which has in it another subordinate clause (second-order dependency), may be harder to understand than the connective of a first-order clause dependent sentence.

9. Phrases in the sentences. The presence of phrases in the sentence may inhibit student understanding of the connective in that sentence.

10. Verbals in the sentence. The presence of infinitives, participles and verb auxiliaries in a sentence may adversely affect the understanding of children for the connective in that sentence.

11. The use of different constructions, especially those sentence constructions where "it" and "there" displace the subject,

may inhibit the understanding the child has of a connective in sentences using these constructions.

12. Clause types. The connectives in adverb and noun clauses may be understood by the child before the connectives in adjective clauses.

13. Presence of one-word adjectives. The presence of one-word adjectives in a clause may inhibit the understanding of the connective in that clause.

IV. DEFINITION OF TERMS

A number of terms used throughout the study are defined in operational terms below for the purposes of this study. Other terms of more limited reference will be defined at the time of their introduction.

Oral language is the arbitrary system of articulated sounds which the English speaking people use as a group to carry on the affairs of their society.[1]

Written language is the graphic representation of the English oral language as it appears in handwriting or print. This includes the commitment to writing or print of the thoughts of a person which have not been uttered in speech.

---

[1] W. Nelson Francis, *The Structure of American English* (New York: The Ronald Press Company, 1958), p. 13.

Understanding or comprehension in this study is the process in reading by which the reader makes sense out of the message on the printed page. This understanding is measured by his ability to choose the right answer in the multiple-choice reading test. Lack of understanding is indicated by choosing the wrong answer although two stages of development towards understanding are recognized by the choice of the answers in which there are grammatical or situational errors.

A sentence is a word or group of words on the printed page which is bounded by a capital letter at the beginning, and a period, question mark, or exclamation mark at the end. The sentence may be a clause and the clause, a sentence. As the research instrument in this investigation is a multiple-choice test, one of the four suggested answers in an item must be chosen by the student if that test item is to be considered as a possible sentence.

A clause is a group of words on the printed page which has a finite verb and which is linked to a word or group of words by a connective. A finite verb is any verb except an infinitive, present participle, or past participle used by itself or in combination with one another. That is, by themselves these three verb forms are not finite verbs although they may be part of finite verb-phrases.[2] In this study a group of words containing a finite

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[2] Francis, op. cit., pp. 379-380.

verb which could be connected to another word or group of words by the connective "that" (simple includer subordinate clause connective -- Chapter III, pp. 65-66) is also considered to be a clause.

A connective is a linguistic form that connects a clause to another clause or some word in it on the printed page. The connectives investigated in this study are those which had the greatest frequency of occurrence in children's readers. The common element appeared to be that these words were semantic links basic to the understanding of meaning. Two forms of connectives were identified: one-word and phrasal connectives. The term "connective" in this study refers to one-word connectives; unless otherwise specified, phrasal connectives are not being studied. The one-word connectives were divided into two groups: those which connected groups of words within a sentence and secondly, those which connected sentences. The details and illustrations of these groups and the classes in them will be given in Chapter III.

V. LIMITATIONS OF THE STUDY

The following limitations of the study are noted:

1. An appraisal of the understanding the child has of connectives in his own speech will not be included in the study.

2. The investigation is limited to sentences patterned from the prose in the selected reader series.

3. The study will not be extended to include an investigation of the pupil's understanding of phrasal connectives.

4. The students tested for the study are representative of the proportion of the total population, students and others, living in the city, small town and rural areas, not the total school population.

5. Children in special schools such as the School for the Deaf, or in special classes, such as Opportunity Classes for children who are mentally retarded, are not included in the study.

6. Children thirteen years and over are not included in the study.

VI. OVERVIEW OF THE INVESTIGATION

The investigation of pupil understanding of connectives has been conducted in three phases, each one dependent upon that preceding it. The phases were:

1. An analysis of a selected sample of sentences in certain basal readers to find out what connectives were being used in these readers, and how.

2. The construction of a reading test to investigate the understanding children have of a selected number of connectives.

3. The administration of this test to children aged eight to twelve in grades four to six who are attending school in urban, small town and rural areas in Alberta to assess their understanding of connectives when they read.

Chapter II will provide a background to the study and will include the related research studies in the fields of oral and written language, and reading.

Chapter III will give the details of the analysis of selected basal reader series and Chapter IV, the construction of the test.

Chapter V will set out the experimental design for the administration of the reading test including the statistical measures taken to control the seven variables of sex, mental age, chronological age, socio-economic status, and listening, reading and written language abilities.

The results of the experiment will be analyzed in Chapters VI to X providing the basis for Chapter XI, the summary, conclusions and implications.

CHAPTER II

THE BACKGROUND OF THE STUDY

The purpose of this chapter is to provide a background for the investigation of pupil understanding of connectives. From the volume of material written about language and reading comprehension by educators and linguists, selections have been made which focus on the problem of this study. The clauses which children use in speech and writing have been investigated frequently but very little research has concentrated on the connectives of the clauses despite the persistent concern of many people for almost a century. Even less has been studied about the connectives children read from the writings of others. By collating the findings of research and the observations of scholars in language and reading, it is hoped that a clearer understanding of the reading comprehension problems children may have with connectives will be developed.

The first section of the chapter will sketch briefly the importance which those concerned with language and education have attached to the connective. Section two will develop a concept of a connective by identifying some aspects of its nature and function on the printed page. A collection of some facts known about the language which the children choose to use in their own speech and writing will follow in section three. Prior to the last section dealing with factors affecting language and reading achievement, section four will present some aspects of the relationship between thought and language.

I. THE IMPORTANCE OF THE CONNECTIVE

Since the turn of the twentieth century writers have been drawing the attention of educators to problems connectives pose in reading situations. Huey[1] in talking about the relations of "the little words" in sentences, that is, the connective and relational words, admitted that there was almost no imagery suggested by them but that they did lead the reader to the "substantive resting-places of the sentence" where some sensory imagery is apt to occur. Discussing the reading lessons of the Horace Mann School of Teachers College, Columbia University in 1906, he wrote that words such as "where" and "what" needed to be learned separately from the first year in school.

Thorndike[2] exhorted reading teachers to pay attention to the dynamics whereby a series of words whose meanings are known singly, produces knowledge of the meaning in a sentence or a paragraph. He felt that the relational words, such as pronouns, conjunctions, and prepositions, had meanings of many degrees of exactitude, and that they exerted varying amounts of force in

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[1]Edmund Burke Huey, The Psychology and Pedagogy of Reading (New York: The Macmillan Company, 1912), pp. 154, 165, 290-293.

[2]Edward L. Thorndike, "Reading as Reasoning: A Study of Mistakes in Paragraph Reading," The Journal of Educational Psychology, Vol. VIII, No. 6, June, 1917, pp. 323, 327.

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different individuals. For example, a student may know exactly what "though" means in a given context but he may treat it in the sentence as if it were an "and" or an "if." Only as teachers were aware of the possibilities of this could they help the student readers correct their mistakes.

In the first edition of his book in 1927 and in subsequent editions each decade later, Gates[3] warned that words involving relationships are often difficult to learn in their precise meanings. It is the responsibility of the reading teacher to use these words precisely and wherever a good opportunity presented itself, to explain them in other terms.

Classifying the conjunctions as "empty words" Flesch[4] acknowledged that the constant use these words have, leads people to assume that they are the easiest words in the language and that everyone is familiar with them. To show the true complexity of the conjunctions he said, "When we read _elephant_, all we have to do is to think of a big animal with a trunk; but when we read _unless_, it means: see what is happening in the next clause; then think back to what happened in the main sentence; and then cancel that in your mind, but not quite."

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[3]Arthur I. Gates, _The Improvement of Reading_ (New York: The Macmillan Company, 1947), p. 156.

[4]Rudolf Flesch, _The Art of Plain Talk_ (New York: Harper & Brothers Publishers, 1946), p. 81.

He admitted that there were two sets of connectives: one set for everyday speech and another set used almost exclusively in print. He denounced the use of compound conjunctions such as "in the event that" instead of "if" and advised his readers that connectives are rarely needed in plain talk. "Which" to him was a "bookish" pronoun and "that" a plain one. Even though he advocated a restricted use of conjunctions by a writer, he admitted that the conventions of the printed page would probably continue to dictate their continued use.[5]

In commenting on Frogner's finding that adverbial clauses are written as fragments more frequently than any other kind, Smith[6] said, "One wonders whether overemphasis upon subject and predicate, which appear in both the clause and the sentence as a whole, and too little attention to the meaning signaled by the connective may cause the difficulty." Squire[7] queried as to when children began to use and understand the "if...then" relationship and when they understood more the subtleties of "although." Hunt[8] found that from grades

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[5]Ibid.

[6]Dora V. Smith, "Growth and Sequence of Language," Reading and the Language Arts, Supplementary Educational Monographs No. 93, December, 1963, H. Alan Robinson (ed.), p. 18.

[7]James R. Squire, in Needed Research in the Teaching of English Washington: U. S. Government Printing Office, 1963, Erwin R. Steinberg (ed.), p. 29.

[8]K. W. Hunt, "A Synopsis of Clause-to-Sentence Length Factors," The English Journal, Vol. 54, No. 4, April, 1965, pp. 300-309.

four to twelve, the percentage increase in the length of the clauses was the same as the percentage increase in the number of subordinate clauses and noted that teachers had to know what was happening inside those clauses as they were decisively longer in the upper grades.

Among the linguists who recognize the importance of the connective on the printed page, are Lloyd and Warfel.[9] Classifying the clause markers as "little words" they warned that no more futile advice could be given to the reader than to pay attention to the big words and let the little words take care of themselves. These clause markers are substitutes for the complicated patterns of intonation that tell the ear and the brain how to hear speech. Gleason called for the study of "connectors" in these words:[10]

> Compared with other languages, English has a remarkable variety of clause connectors, and these have widely varying patterns of use. This is one of the features of the language which give it great flexibility. It permits the signaling of complex interclause relationships with great precision when this is desired, or more loosely when that is preferred. Written English uses a much greater variety than does spoken. The connectors, therefore, constitute one of the important resources for writing to which students must be introduced carefully and thoroughly. They deserve a great deal of study against a structural framework.

Fendell[11] observed that his students had trouble relating their

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[9]Donald J. Lloyd and Harry R. Warfel, American English in its Cultural Setting (New York: Alfred A. Knopf, 1957), pp. 415-416.

[10]H. A. Gleason Jr., Linguistics and English Grammar (Toronto: Holt, Rinehart and Winston, Inc., 1965), pp. 343-344.

[11]Stanton J. D. Fendell, "Language Patterns in Student's Writing," The English Journal, Vol. 40, 1951, pp. 274-276.

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thoughts, and that they could not think too abstractly. Hence, they cared to say little in their written work. If they did use subordinate clauses they were brief, uninformative, and unavoidable and began with "who" and "which" but rarely the relative pronoun "that." They made occasional use of "if, because," and were overfond of "and, so but, then, and which." He taught his students sentence structure and their writing improved appreciably.

The exhortations of the psychologists, educators, and linguists here are representative of those who urge reading teachers to take note of connectives on the printed page.

II. THE NATURE AND FUNCTION OF A CONNECTIVE

Through a discussion of some of the definitions of the connective by grammarians, this section will give a historical perspective to the study and will develop in part at least, a concept of the connective itself.

A Connective Joins Words

By definition a connective is a linguistic form that connects words or word groups, especially a relative pronoun, a conjunction, or a preposition.[12] The terms "connective" and "connector" as used

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[12]Philip Babcock Gove (ed.), Webster's Third New International Dictionary of the English Language Unabridged (Springfield: G & C Merriam Company, 1964), p. 481.

in this section include the same linguistic forms for the most part but the term "conjunction" usually refers only to the words which link co-ordinate and subordinate clauses. Relative pronouns are frequently included in the term "conjunction."

In a study of the development of English grammar of 1585 to 1735 Vorlat[13] commented that "no grammarian, ancient or modern, hesitates to define the conjunction by its connective function." There were some differences of opinion as to whether the connective function was limited to the sentence or clauses only, or whether words and word phrases could be connected also. Ramus, Hume, Butler, and Jonson were quoted as those who restricted the connecting function of the conjunction to clauses and sentences only. Another group of grammarians, Bulloker, Wharton, Miege, and Maittaire were said to hold the same view as Lily who was quoted as saying that the conjunction "joineth wordes and sentences togither."[14]

Vorlat[15] also pointed out that some of those grammarians who restricted their definition of a conjunction to that of linking clauses and sentences believed that some sentences were contracted and although the connective appeared to be connecting words, the expanded words constituted a complete sentence. For example, in the

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[13] Emma Vorlat, Progress in English Grammar 1585-1735 (A Study of the Development of English Grammar and of the Interdependence Among the Early English Grammarians), (Luxemburg, Catholic University of Louvain, 1963), Vol. 1, p. 181.

[14] Ibid.

[15] Ibid., p. 182; Vol. III, p. 438.

sentence, "John and Peter went for a walk," "John" is connected to "went for a walk" and so is "Peter." The connective "and" really connects two sentences, therefore, "John went for a walk" and "Peter went for a walk."

This divergence of opinion continued almost to the end of the nineteenth century when Earle[16] writing of prepositions and conjunctions which he called "the link-word group" said:

> I know not of any happier term to comprise that vague and flitting host of words which, starting forth from time to time out of the formal ranks of the previous parts of speech to act as the intermediaries of words and sentences, are commonly called Prepositions and Conjunctions.
>
> These two parts of speech have a certain fundamental identity, combined with a bold divergence in which they appear as perfectly distinct from one another. Their distinction is based on the definition that prepositions are used to attach nouns to the sentence, and conjunctions are used to attach sentences or to introduce them.
>
> The neutral ground on which they meet, and where no such discrimination is possible, is in the generic link-words, _and_, _or_, _also_, _for_, _but_.

Linguists of the twentieth century acknowledge that the connective links single words, clauses, and sentences.[17] This study is confined to an investigation of one-word connectives which themselves are either part of a clause or very closely

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[16]John Earle, _The Philology of the English Tongue_ (Oxford: At the Clarendon Press), MDCCCLXXI, p. 434.

[17]Archibald A. Hill, _Introduction to Linguistic Structures_ (New York: Harcourt, Brace and Company, 1958), pp. 398-400; James Sledd, _A Short Introduction to English Grammar_ (Chicago: Scott, Foresman and Company, 1959), pp. 201, 203; and Dona Worrall Brown _et al._, _Form in Modern English_ (New York: Oxford University Press, 1958), pp. 140, 160-180.

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associated with it, and which function as connectors of that clause to words or groups of words. The concern for the linking function of the connective exists also for the group of words defined as sentence linkers in Chapter III.

Sledd[18] called the words defined as sentence linkers in this study "sentence adverbials". Hill[19] called the connecting power of words such as "thus" a "stylistic linkage" because their use in a sentence is more natural if placed in a stylistic situation where the preceding sentence prepares for their introduction. For example, the sentence, "Tom always buys groceries at the supermarket on Saturday," naturally precedes "Therefore, you can meet him there."

The Connective Expresses the Nature of the Connection

Of interest also in the definitions of early English grammarians is the "ordering function of conjunctions" in addition to the connecting function.[20] That is, not only are the words, clauses, and sentences connected but the nature of the connection is expressed by the conjunction as ideas are ordered as subordinate or co-ordinate. The meaning of this phrase "the nature of the connection" is elusive and difficult but important to this study of the reading comprehension of connectives. The nature of the connection can be expressed in at least two ways. First, the particular connective uses signals

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[18]Sledd, op. cit., p. 145. [19]Hill, op. cit., p. 400

[20]Vorlat, op. cit., Vol. 1, p. 181; Vol. III, p. 439.

to tell whether the ideas associated are co-ordinate or subordinate to each other. In addition, the connectives have different meanings which they can express within each of these two categories, expressions for example, of concession, conditions, and cause.

Mattaire's definition of conjunction suggests this additional function of a conjunction:[21]

> A Conjunction is a Particle, which not only qualifies and explains the signification of some Part of Speech, but joins also, and denotes a dependence between, like Words or Sentences; and often helps to supply what is wanting in that, which is joined, out of that, which it is joined to.

Earle[22] writing in 1871 divided words into two classes, presentive and symbolic. Presentive words were those which presented objects to the mind, that is, presented any conception to the mind. The symbolic words which included conjunctions, are those which by themselves presented no meaning to the mind, but instead depended for their intelligibility on a relationship to some presentive word or words. When a word is presentive, it is tied to a single object, but when it becomes a symbol, it is ubiquitous in its function. He then proceeds to acknowledge that although the conjunctions are essentially symbolic words, they still retain "a great deal of half-assimilated presentive material." His comment is worthy of quotation:[23]

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[21]Ibid., Vol. III, p. 439.

[22]Earle, op. cit., pp. 195-197; 444-445.

[23]Ibid., pp. 456-457.

> It is not indeed a singular quality in the conjunction, that being itself essential symbolic, it should receive accessions from the presentive groups. This is seen also in the pronoun and in the preposition, and it is only as a matter of degree that the conjunction is remarkable in this respect. As far as observation reaches, the symbolic element is everywhere sustained by new accessions from the presentive, and it is worthy of note that the extreme symbolic word, the conjunction, which is chiefly supplied from groups of words previously symbolic, seems to be the one which most eagerly welcomes presentive material, as if desirous to recruit itself after its too great attenuation through successive stages of symbolic refinement.

In a backward look he commented that the employment of conjunctions had greatly diminished from their luxuriant use in the three centuries prior to the late nineteenth century when he wrote. Of his own time he said that a comparatively few "undemonstrative" conjunctions sufficed for the literature. He concluded, however, by saying that although the conjunctions were less in vogue, they were employed with wider effect.[24]

Some grammarians writing within the past two decades have impressed their readers with the fact that meaning is both important and real to them but their main concern is with the structure of the language, that is, how the language forms are used to express meaning. As meaning is their end-product, therefore, they do not want

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[24]Ibid., pp. 457-458.

it to be a part of the process.[25] They prefer to concentrate on investigating the form of the connection in the grammatical structures and to leave the semantic aspects to others in the linguistic field.

The connective then not only connects but it also indicates to the one receiving the communication the nature of the connection.

A Connective is Coexistent with Other Words Which Connect

Gleason emphasized that the connective may be only one connection in the clause. There are often other words, "do," "this," and pronouns, "he," "she," etc. which coexist with the connectives to make an association from one clause to another.[26] The connective does not always bear the entire burden for the association of words and ideas then. It is usually a member of a team of words.

The Connective and the Clause May Complicate the Grammatical Structure of the Sentence

When a connective links one clause to another in a sentence, the grammatical structure of the sentence is no longer simple. The conjoining of clauses in a sentence compounds the sentence structure

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[25] W. Nelson Francis, The Structure of American English (New York: The Ronald Press Company, 1956), p. 226; and Hill, op. cit., pp. 409-413.

[26] H. A. Gleason Jr., Linguistics and English Grammar (Toronto: Holt, Rinehart and Winston Inc., 1965), pp. 344-350, 455.

while one clause subjoined to another clause adds some measure of complication to the structure of the sentence. Earle[27] recognized this and expressed it in these words:

> Of all parts of speech the conjunction comes last in the order of nature. As the office of the conjunction is to join sentences together, it presupposes the completion of the simple sentence; and as a consequence, it would seem to imply the pre-existence of the other parts of speech, and to be the terminal product of them all... The necessity for conjunctions (other than and, or) does not arise until language has advanced to the formation of compound sentences. Hence the conjunctions are as a whole a comparatively modern formation ... Almost all the conjunctions are recent enough for us to know of what they were made. And indeed they may conveniently be divided according to the parts of speech out of which they have been formed.

When a group of words is introduced by a connective, that clause mirrors some of the potential for variability which a sentence has. A clause may occupy different positions in the sentence, initial, medial, or final, or it may be the entire sentence itself. It may be connected to a clause outside the sentence altogether. The connective can join clauses of varying length from a few words to many words. The grammatical structures within these groups of words may include another connective which in turn is joining words or groups of words. A weighted index of subordination as used by Loban[28] is an attempt to measure the grammatical complexity which

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[27]Earle, op. cit., pp. 444-445.

[28]Walter D. Loban, The Language of Elementary School Children, (Champaign: National Council of Teachers of English, 1963), p. 61.

a clause in a sentence or a clause within a clause added. In totalling points for the index he assigned extra points to a dependent clause within another dependent clause or which modified another dependent clause. Extra points were also given for dependent clauses containing a verbal construction such as an infinitive, gerund, or participle, and for any dependent clause within or modifying another dependent clause which, in turn, is within or modifies another dependent clause.

The clauses have a wide variety of structures and each connective associated with them has a range of influence on the meaning of the clause. The range may overlap with the range of other connectives, as a clause within another clause illustrates in this sentence, "He was in the barn when the storm broke the window that he had just mended." The connective "when" may be said to exert an influence over the entire clause including the second subordinate clause.

Another dimension of the complexity of the connection a connective makes, is the degree of its integration into the structure. Some connectives simply introduce a clause while others particularly the relative pronoun subordinate clause connectives, assume additional responsibilities inside the clause functioning as a noun or other part of speech.[29]

Sledd[30] felt that part of the complexity of making a connection was the degree of explicitness the writer could give the

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[29]Gleason, op. cit., pp. 333-335; 341-342.

[30]Sledd, op. cit., p. 313.

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connection by varying his style of writing. Certainly this would be a complicating factor in reading as the students would be left to discover the precise relationship among successive statements resulting in problems of comprehension.

The Connective May be Expendable to the Clause

The absence of the connective, particularly the word "that" is one of the grammatical changes noted by Barber. "It is becoming increasingly common to omit the relative that, for example, to say a man I know rather than a man that I know. This is not new, but the balance of forms is shifting, especially in speech, where that is becoming positively rare."[31] Brown[32] refers to it as an omitted or dropped conjunction, and commented on the particular problem the resulting construction posed for the reader who is used to grabbing groups of words in reading according to the grammatical structures of English. When the connective is absent, two nouns may follow each other as in the sentence, "The tree lightning destroyed in 1950 was our prize elm," and his first response may be to interpret "tree" as a noun modifying the noun "lightning."

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[31] Charles Barber, Linguistic Change in Present-Day English (London: Oliver & Boyd, 1964), p. 138.

[32] Brown et al., op. cit., pp. 180-185.

Jespersen[33] on the other hand explained that "it would be wrong to imagine that ... the conjunction <u>that</u> is omitted." He said that in the sentence "I think he is dead," originally there were two independent sentences: "I think" and "he is dead." The connective was never present. The subordination of the clause is left to be inferred from the context. In the sentence, "I think that he is dead" the two independent sentences were originally, "I think that" and "he is dead." The word "that" was accentually weakened and it lost its place as a demonstrative pronoun and came to be thought of as belonging to the clause and so became a conjunction.

Gleason[34] commented on the expendable quality of the connective "that" unless it were in the clause in the subject position, "It is notable that <u>that</u> is never omitted from a clause in the subject position as it commonly is elsewhere."

<u>The Connection Must be Intelligible to Others</u>

Whorf[35] in searching for a term to describe the connection of ideas felt that a necessary criterion of a connection is its intelligibility to others without reference to individual experiences.

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[33] Otto Jespersen, <u>Essentials of English Grammar</u> (London: George Allen & Unwin Ltd., 1933), pp. 350-351.

[34] Gleason, <u>op</u>. <u>cit</u>., p. 317.

[35] John B. Carroll (ed.), <u>Language, Thought, and Reality: Selected Writings of Benjamin Lee Whorf</u> (Cambridge: The M. I. T. Press, 1956), pp. 36-39.

This required that the connection be "immediate in its relationship" and therefore the individuality of the person could not enter to the extent that it might in free association. To Whorf, the connection of ideas was a "controlled association." This concept is essential in reading comprehension. When a child reads what others have written, he too, as the reader, must make a controlled association, connecting the ideas as the writer intended, keeping his own individual experiences in suspension for the moment. Whorf assumed that a good connection would be one that would be intelligible without reference to individual experiences.[36] A good writer would so use a connective and a good reader would so read it.

Donaldson[37] found that one of the main forms of errors children made was the addition of their own information to that already given. The lack of loyalty to what information was given them resulted in the intrusion of thoughts and ideas of their own into the problem given. This too may happen in reading. When a child reads a connective he should adhere strictly to the meaning given it by society and the author, and keep his own thoughts about other meanings it may have for him, away from his thinking for the moment.

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[36] Ibid.

[37] Margaret Donaldson, A Study of Children's Thinking (London: Tavistock Publications, 1963), pp. 201-203.

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A Connective Changes as the Language Changes

"There is some evidence to show that, in written English (at least in novels), sentences have become shorter during the past fifty years; at the same time, there has been a decline in the number of continuative relative-clauses (i.e., non-defining or non-restrictive ones)."[38] Barber went on to say that in our speech Englishmen are tending to greater fragmentation, to looser structures and that we may well be on the eve of a change in which the large-scale formal structures of the language which are now preserved largely in writing, may be broken down and replaced by smaller syntactic units loosely connected.[39] If this is so, the connection of one idea with another using a connective may be greatly restricted.

As the language changes, changes of another nature take place. New connectives are being admitted into the language such as the use of "like" as a conjunction. Although it has been so used for centuries, it was not regarded as literate usage until the last world war when it became increasingly common.[40] Jespersen[41] commented also on the inclusion of "like" as a conjunction into the language but said that even though words such as "like" and "once"

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[38]Barber, op. cit., p. 143.

[39]Ibid., p. 144. [40]Ibid., p. 137.

[41]Otto Jespersen, Growth and Structures of the English Language (Oxford: Basil Blackwell, 1930), p. 193.

were being used more commonly, there were many who would not countenance their use in the schools.

Watts[42] gave the dates when the connectives were acquired in the English language with the comment, "the appearance of some of the latest acquired of these words ("which"-1300; "because"-1305; "although"-1325) in the speech of little children may be regarded as a sure sign of linguistic progress." He appears to countenance the thought that the understanding of connectives may be according to their order of appearance in the language. That is, the connectives last acquired are the more difficult to understand.

Summary

A connective then, is a linguistic form that has been the center of discussions for several centuries. Performing the function of connecting clauses and sentences, the connective is at times deletable and is subject to changes as languages change.

III. THE CLAUSES IN CHILDREN'S LANGUAGE

Many investigators have written about the language children speak or write. A summary of some of the aspects of their reports is included in this chapter because the results will give an

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[42]A. F. Watts, The Language and Mental Development of Children: An Essay in Educational Psychology (London: George G. Harrap & Co., Ltd., 1944), p. 73.

understanding of the development of children's language and provide some insight into the reasons why children fail to comprehend in reading what others have written for them.

The section will include an account of the language of print, the studies of clauses in children's language and possible problems in the memory of sentences containing multiple clauses.

<u>The Language of Print</u>

Before a report is given concerning the language structures which investigators have found in the oral and written language of children, the findings and observations of some who believe that the basic cause for some of the problems with the language of print for children lies in differences between it and the language which children themselves use, will be set forth.

Writing more than two decades ago, about the language and mental development of children, Watts[43] pointed out there were "two varieties of the same language," informal and formal. The children knew the informal oral and written language which they used but there were many structural and vocabulary differences in the formal language which they had to be taught. Watts further insisted that the oral language in some classrooms was formal from the child's point of view while the formal written language of the texts without the usual help from paralinguistics forced the child to be more

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[43]*Ibid.*, pp. 75-76.

careful about picking up more precise meanings, language signals of word order, and variations in punctuation.

Gleason wrote at length of the problem phrasing it in these words:[44]

> In addition to the complex system of spoken language types, there is another at least partially independent set of patterns: written English. A literate American must control a very considerable number of forms, both spoken and written, and must understand and react to the functional significances of each. Literacy is no small attainment, and it should not be surprising that it requires years to get a full working command. Most Americans are unaware of the depth and extent of the contrasts between written and spoken English.

Speaking of the urgent task in English language research this realization of the various forms of language precipitated, Gleason[45] added that ultimate applications in the teaching of reading, literature, and composition would be numerous and significant.

Ruddell[46] investigated the effect of the similarity of oral and written patterns of language structure on reading comprehension and reported two main findings: Firstly, reading comprehension is a function of the similarity of patterns of language structures in reading material to oral patterns of language structure used by

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[44]Gleason, op. cit., p. 367.

[45]Ibid., p. 368.

[46]Robert B. Ruddell, An Investigation of the Effect of the Similarity of Oral and Written Patterns of Language Structure on Reading Comprehension (unpublished Doctoral dissertation, Bloomington; School of Education, Indiana University, 1963), pp. 117-118.

children. Secondly, reading comprehension on high frequency patterns of oral language is significantly greater than on low frequency patterns of oral language structure.

These key findings and observations about the language of print may help to explain some of the reasons why difficulties may exist in the reading comprehension of connectives.

Number of Clauses Children Use in Their Language

Although it was very difficult to compare the figures reported by various studies on the number of subordinate and coordinate clauses used by children in their language because of the wide variety of ways of arriving at the figures, the percentages of subordinate clauses found in written language about age 9-1/2 varied from the 11.6 per cent reported by Harrell,[47] to 27.4 per cent by Watts,[48] with LaBrant's figures 19.0.[49] At twelve years of age the range was about 15.6 per cent by Harrell to 36.3 reported by Watts.[50]

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[47]Lester E. Harrell Jr., "A Comparison of the Development of Oral and Written Language in School-Age Children," Monograph of the Society for Research in Child Development, Inc. (Ohio: The Antioch Press, 1957), Vol. XXII, No. 3, pp. 34-35.

[48]Watts, op. cit., p. 123.

[49]Lou L. La Brant, "A Study of Certain Language Developments of Children in Grades IV to XII, Inclusive," Genetic Psychology Monographs, XIV (November, 1933), pp. 387-491.

[50]Harrell, loc. cit., and Watts, loc. cit.

In oral language Harrell[51] found that children used about 11.6 to 12.8 per cent subordination with Davis[52] reporting figures about 5.5 per cent higher.

The results of the studies agree generally on two points. The amount of subordination used by children aged eight to twelve is somewhere from 10 to 30 per cent of their total sentences produced and the amount increases from year to year.

Very few of the studies reported the number of co-ordinate clauses children produced but Hoppes[53] recorded that children in grades four to six used about two co-ordinate clauses to three of the subordinate clauses in their written work. From grade to grade the ratio of co-ordination to subordination decreases with adults using about four co-ordinate clauses to ten subordinate clauses in their letters.

It is reasonable to expect that children would read connectives best with understanding if they were introduced to them gradually from grades four to six.

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[51] Harrell, op. cit., p. 34.

[52] Edith A. Davis, The Development of Linguistic Skill in Twins Singletons with Siblings, and Only Children from Age Five to Ten Years (Minneapolis: The University of Minnesota Press, 1937), p. 91.

[53] William C. Hoppes, "Some Aspects of Growth in Written Expression," The Elementary English Review, Vol. 9, 1933, p. 68.

Types of Clauses in Children's Language

Watts discussed the importance of noting the gradual increase not only in the number of clauses children used in their language but also the kinds of dependent clauses they used from year to year. From ages eight to twelve they added about two different kinds of clauses to their repertoire.[54]

The frequency with which various kinds of clauses are used both in oral and written work was found to be constant, with adverb and noun clauses heading the list followed by adjective clauses. In oral language children used more noun clauses than adverb but reversed the order in their written language. Studies which reported different types of adverb clauses found that time clauses were used most frequently by children, then, cause clauses and finally, comparison. All agreed on the comparatively low percentage of adjective clauses in oral and written work of children until they were past eleven years of age, and indicated that the placement of these clauses in sentence positions where they interrupted the main flow of discourse requiring the additional burden of holding information from the main clause in abeyance, could be one reason for their late development.[55] Harrell[56] further reported that adverb clauses

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[54]Watts, op. cit., p. 124.

[55]Davis, op. cit., p. 92; Harrell, op. cit., p. 48; Watts, op. cit., p. 125; and Mildred C. Templin, Certain Language Skills in Children (Minneapolis: University of Minnesota Press, 1957), pp. 94-95.

[56]Harrell, op. cit., p. 57.

of condition, place, concession, and purpose were used very rarely by children in grades four to six. From the reports of these studies, it would be expected that the connective "that," of the noun clause, the connective "when" of the time clause, and the "because" of the cause clauses may be three connectives with which children have little trouble in reading as they voluntarily use them in their own language. On the other hand, connectives which introduce the adjective clauses, the relative pronoun subordinate clauses and the adverb clauses used infrequently, may be difficult for children to read in grades four and five especially.

Gleason[57] emphasized that the non-restrictive relative clause is "peculiarly a literary construction," ... a pattern which is new and strange to most children in the schools." This literary feature of the written language of adults may make their comprehension of the connectives in them more difficult to attain.

Davis[58] commented on the use of three connectives by children in both their written and oral language. She quoted Heider as reporting that difficulties arose on the introduction of doubt or possibility especially with "if" and "whether" in the object clause

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[57] Gleason, op. cit., p. 341.

[58] Edith A. Davis, "The Location of the Subordinate Clause in Oral and Written Language," Child Development, Vol. 12, No. 4, 1941, pp. 346-347.

of an interrogative indirect discourse sentence as in this one, - "I asked her why she went home if she wanted to see the parade." Of the children aged 9-1/2 years in her own study she reported that they "tended to express the connective in relative clauses and to omit it in object clauses, although the older children used the elliptical form less than the younger ones." She further recorded that of the relative pronouns, the children used "that" much more often than "who, which, or what." There do appear to be particular problems with individual connectives.

Struck[59] wrote against the myth that conjunctions could not be used initially in sentences. He believed that teachers gave children the impression that to do so was forbidden. If this is so, children may find some difficulty with them in reading.

The Position of the Clause in Children's Language

For the age groups investigated in this study Harrell[60] reported in detail regarding the position of the subordinate clauses. The noun clauses came after the main clause in the greatest percentage of the cases, in both oral and written language. The adverb clauses on the other hand, with the exception of condition clauses in oral language at age 11-1/2 years were found more often at the beginning

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[59] Herman R. Struck, "The Myth About Initial Conjunctions," The English Journal, Vol. 54, January, 1965, No. 1., pp. 42-44.

[60] Harrell, op. cit., pp. 59-61.

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of the sentence. The adjective clauses frequently interrupted another clause and their medial position may contribute to their infrequent use and the late development of their understanding.

From these studies it would seem that if the connective were either near the beginning or the end of the sentence rather than in a place where the main clause is interrupted, that connective may be easier to read with understanding.

The Length of the Clause

In the choice of procedures to follow in ascertaining the length of the clauses a difference was noted in the ways investigators look at the association of ideas through clauses. Harrell[61] modified the usual procedure of counting as one clause, a subject and compound verb, counting it instead as two. The reports then of clause length in both the oral and written language of the children, are slightly lower than other studies reported. In Harrell's study there was very little change between nine years of age and 11-1/2 years, 6.18 words for a written language clause and 6.80 words for an oral clause.

Hunt[62] investigated the clause-to-sentence length factors and decided that in order to portray the true situation of growth in written language he would use a minimal terminable unit. This unit consisted of the main clause and whatever subordinate clauses

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[61] *Ibid*., p. 33.

[62] Hunt, *op*. *cit*., p. 306.

happened to be attached to or embedded within it. Each unit then would be "minimal in length and each could be terminated grammatically between a capital letter and a period." With this unit he felt that he could show two vital growth factors, the growth in the length of the clause and also the increase in the number of subordinate clauses used in a sentence. He found that from grade four to grade twelve the length of the clause increased from 6.6 words to 8.6 words while the number of subordinate clauses in each sentence increased on the average from .30 to .68. Hunt felt that it was imperative that educators find out what happened inside these clauses as they became longer.[63] Even though this study may show that children find trouble reading the connectives in various test items, it is almost certain that the hindrance to comprehension does not lie solely within the connective itself. There is probably a constellation of causes at work within the clauses.

The Complexity of the Clauses

In addition to the complexity of an increase in the number of subordinate and co-ordinate clauses from grades four to six in the oral and written language of children,[64] several writers probed further into other forms of language problems.

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[63] Ibid.

[64] Mata V. Bear, "Children's Growth in the Use of Written Language," Elementary English Review, XVI, (December, 1939), No. 8, pp. 312 - 319.

Watts[65] warned that assessing complexity of clauses simply by taking a count of them in a sentence would overlook what he termed "the tendency to compression." That is, the use of prepositional phrases and infinitive expressions as alternatives to using a clause or as additional information packed into a clause.

Loban,[66] too, recognized the additional problems "infinitives, participial phrases, gerunds, appositives and other devices" presented in clauses. His weighted index of subordination allowed two extra points for each of these constructions in a dependent clause.

The use of infinitives and participles is slightly greater in written language of children than in their oral language and this number increases with age.[67] Loban[68] found that the high achievement group in oral language used more infinitives and verbals than did the low group. Their flexibility in the use of these elements together with clauses set them apart from the low achievement groups.

Watts[69] indicated the ages at which different adverbial phrases were used freely by children and Gleason[70] indicated the complexities of uses of adverbs, adjectives, "it" and "there" sentence constructions and the passive voice.

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[65]Watts, op. cit., p. 124. [66]Loban, op. cit., p. 61.

[67]Watts, op. cit., pp. 129-132.

[68]Loban, op. cit., p. 84. [69]Watts, op. cit., p. 129.

[70]Gleason, op. cit., pp. 309-325; 412-413.

Although none of these elements are properly a part of this study these few references are given to indicate the complexity of clauses and the problem of trying to determine possible sources of hindrance to reading comprehension.

Memory for Clauses

Related directly to the question of the complexity of clauses and of a clause within a clause is the question of the limitation of human memory. An adjective clause interrupting the main clause forces the reader to suspend the decoding of the main message and hold the information already received while decoding the message of the subordinate clause and incorporating its message into that of the main clause. The difficulty of this cognitive task reported by Miller and Isard[71] acknowledged that mature subjects could hear and accurately recall a sentence with one relative clause in it. Some managed two self-embedded clauses but all experienced difficulty with more than this number.

Chomsky[72] confirmed this, observing that repeated nesting contributes to unacceptability and self-embedding more so.* He

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[71]George A. Miller and Stephen Isard, "Free Recall of Self-Embedded English Sentences," Information and Control 7, (1964), pp. 292-303.

[72]Noam Chomsky, Aspects of the Theory of Syntax (Cambridge: The M. I. T. Press, 1965), pp. 12-14.

*A nested construction is one that falls completely within another construction as in "The boy who broke the window that you just cleaned ran home." Self-embedding has the same construction as the nesting but it is of the same type as the first construction. For example, "This is the man who the players who the students identified wanted to meet."

reported further that the nesting of a long and complex element reduces acceptability so the longer and more difficult the clause within the clause was, the less likely children would be to understand the sentence when they read it. Optimal in acceptability were the multiple-branching constructions in which there was no internal structure, that is, no further association among the immediate constituents after the first reference. For example, in the sentence, "The teachers, principal, and students went to the hockey game," the "teachers," "principal" and "students" are recognizable immediate constituents of the subject and they have no further association among themselves in this sentence.

Miller[73] commented on the importance of recoding, or rephrasing it to oneself or to others, and indicated that the process was a powerful weapon for increasing the amount of information that people can process. It would appear then that some of the connectives such as "although" do call for a type of recoding as the information given in the main clause has to be reconsidered and the final judgment altered to accommodate the concession. Perhaps the limitations of the "immediate memory" span may be a complicating factor in reading clauses.

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[73] George A. Miller, "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information;" Readings in the Psychology of Cognition, edited by Richard C. Anderson and David P. Ausubel (Toronto: Holt, Rinehart and Winston, Inc., 1965), pp. 264-266.

<u>Summary</u>

The language others write for children to read is usually similar to the language children themselves write but there are differences.[74] Therefore, the aspects of clause number, type, position, length, and complexity discussed, can be expected to give some indication of possible reading comprehension problems by showing some of the places where the formal language of print is so different from that which the child would choose to use that he may not be able to read it with understanding.

IV. THE DEVELOPMENT OF THE USE OF CONNECTIVES

As this investigation is focused on the understanding which children have of connectives in reading, this section will present some contributions to our knowledge of the relationship between language and thought. The first part of the section will attempt a brief description of the place of connectives in language and thought and the second section will report on the development of the use of connectives by children.

<u>The Place of the Connective in Language and Thought</u>

Connectives are part of the structure of the English language and the structure is a particular instance of the language system.

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[74] Loban, op. cit., p. 87; and Ruth G. Strickland, <u>The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children</u> (Bloomington: School of Education, Indiana University, 1962) Vol. 38, No. 4; p. 86.

Each sentence in English has three separate systems: phonology, grammar, and semology, which operate simultaneously.[75] The three systems bring forth one sequence of sounds, speech. The sounds heard in the stream of speech are the result of the working of the three systems together. Because there are these underlying systems there is language structure. The structure then is subservient to the systems of the language, and is a reflection of them. The structure is identified by a number of signals, some of which are the function words. A connective is a function word.[76]

In a function word the grammatical function is said to overshadow the semantic function explaining why some call them the "empty words."[77] The function words build up an expectancy that a certain language structure is likely to follow. This is the role of the connectives. They lead the reader to expect a clause.

Piaget[78] reported that there was a very close relationship between language and thought of children, with the child communicating freely with his environment through language. By listening to the spoken words (and later by using the reading process as well),

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[75]Gleason, op. cit., pp. 100-106.

[76]Ibid., pp. 131, 333-335; 341-344.

[77]Flesch, op. cit., p. 81.

[78]Jean Piaget, The Language and Thought of the Child (New York: The World Publishing Company, 1962).

the child was able to take in information about his world, past, present, and future. His inner mental manoeuvres freely made use of language also, to manipulate his learning, deal with his associations, and complete his logical deductions when his development enabled him to do so. In accommodating to the environment Piaget believed that the child continuously used language.

Upon close observation of children when they were in a directed testing situation and when they were talking among themselves, Piaget[79] learned that children use connectives in speech before they grasp the structures of meaning which correspond to the syntactic forms they are using. That is, the grammar precedes the logic. Vygotsky[80] corroborated the findings of Piaget, indicating that the child acquired the structure of the oral language through imitation of his elders and peers and then later when he became more aware of the meanings which others attributed to the words of his language, he incorporated them into his repertoire of meanings and used them in more effective communication with those in his environment.

In speaking of the relationship between thought and word Vygotsky stated that thought and words are not cut from the same

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[79] Ibid.

[80] L. S. Vygotsky, Thought and Language (Cambridge: The M.I.T. Press, 1962), pp. 126-127.

pattern and that the structure of speech does not simply mirror the structure of thought. As it turns into speech, thought undergoes many developmental changes. To him, there were two aspects of speech, the semantic and the phonetic, and in each stage of the development of word meaning, the distance between these two aspects of speech widens, but each stage has its own interrelations between them. The child's ability to communicate through language is directly related to the differentiation of word meanings in his speech and consciousness. When the child's development is completed he is able to formulate his own thoughts and also to understand the speech of others. Until then, Vygotsky believed that the child used words which coincided with those of the adult in their objective reference but which did not coincide in meaning.[81] In reading, the child could give a connective his own private meaning.

Osgood[82] posed a theory of learning comprising a two stage model with three levels of organization applied at each stage, and fitted it to the reading process. Understanding connectives would be an example of the first stage, decoding, the process whereby an individual transforms the physical energies of the environment into perceptions. The three stages are projection, integration, and

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[81] Ibid.

[82] Charles E. Osgood, "A Behaviouristic Analysis of Perception and Language as Cognitive Phenomena," Contemporary Approaches to Cognition, ed. Psychology Department (Cambridge: Harvard University Press, 1957), pp. 75-95.

representation. At the projection level the sensory visual stimuli from the printed page are relayed to the brain but no learning takes place. At the next stage the minimal units in language decoding, the phonemes, are organized and grouped in sequences with much learning capable of going on through the building up of many integrations and integrational hierarchies of alternatives (syntactical). In the highest stage, representation, decoding operations are terminated in the mediation of meaning units followed by an initiation of encoding, the total process whereby the intentions of an organism are expressed and are turned into environmental events. This stage if reached in reading would represent the assimilation of reading material with a resultant change in the behavior of the reader.

To accommodate to the problems of the formal language of print which force the reader to code on various levels in order to grasp the levels of meaning, Osgood's model would have to allow for different representational levels. The model does indicate however, the close association of reading to thought.

Summary

Connectives and the clauses with which they are associated are part of the structure of English. It is accepted by Piaget, Vygotsky and Osgood that there is a close relationship between language, reading and thought.

The Development of the Use of Connectives by Children

Stern[83] is quoted as saying by the age of four or five the child's language development is "mainly finished." Boyd[84] also believed that the child in his early years "has an almost adult command of the instrument of language." The use of the word "command" implies that the child would be almost as competent in expression as an adult. But he is not. As has been indicated in considerable detail in section one of this chapter there are developmental levels in language learning.

In a later work Piaget[85] attempted to show how the child developed his understanding of the connective "because." Using it first as a link between two events for cause and effect, the child later used the word to express motive for action. As his understanding developed he used "because" to express logical justification. In testing the understanding of connectives in this study, therefore, a development of meaning should be noticeable especially between the children of the highest and lowest mental ability groups. (Chapter I, pp. 6-7).

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[83]William C. Hoppes, "Some Aspects of Growth in Written Expression," The Elementary English Review, Vol. 9, 1933, p. 67, citing Wm. Stern.

[84]William Boyd, "The Development of Sentence Structure in Childhood," The British Journal of Psychology, XVII (January, 1927), p. 191.

[85]Jean Piaget, Judgment and Reasoning in the Child (Paterson: Littlefield, Adams & Co. 1951, reprint), pp. 6-8.

Kruglov[86] reported that not only did the levels of understanding exist, but children sought out the level of their own development and worked there. In defining words, children in grade five used synonyms 41 per cent of the time defining by explanation only 7 per cent of the time. That is, they tended to choose the response characteristic of the lower conceptual level, their own level.

In addition to the reports already presented one further point will be made to acknowledge the complexity of reading comprehension. As the present study must use language in the dual role of both the research instrument and the object investigated, little may be added to our understanding of the verbal comprehension factor beyond the structural level. The aspects of the reading process validated by Jenkinson[87] and the three additional aspects identified in the study showed dimensions of comprehension relatively unexplored as yet. The latter three, sensitivity to language, verbal closure, and verbal fluency, will suffice to remind the reader of the total setting in which reading comprehension must be kept if a clear perspective is to be maintained.

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[86]Lorraine P. Kruglov, "Qualitative Difference in the Vocabulary Choices of Children as Revealed in a Multiple-Choice Test," _Journal of Educational Psychology_, Vol. 44, (1953), pp. 229-243.

[87]Marion Dixon Jenkinson, _Selected Processes and Difficulties of Reading Comprehension_ (unpublished Doctoral dissertation, The University of Chicago, Chicago, 1957), pp. 198-207.

V. FACTORS AFFECTING READING ACHIEVEMENT

Loban[88] found that in the oral language of the child the use of subordinating connectives increased with chronological age, mental ability, language ability, and socio-economic status. Ruddell[89] noted the same factors as significant in his study but added that the sex factor was not. He did report that there was some evidence to show that boys had "disproportionately greater difficulty than girls in comprehending reading material written with low frequency patterns of oral language structure." In another study of elementary school children Strickland[90] concluded that there was a significant difference between the use of patterns of subordination and certain variables of intelligence, mental age, occupational status, and parental education. This study will attempt to control statistically each of the factors noted and in addition, through sampling procedures, will control both the factors of sex and place of residence of children, urban, small town, or rural.

In noting the results of studies in language and reading achievement two facts have been emphasized. One is the language lag which boys have in some language environments. Loban[91] found that the boys who were low in oral language ability consistently used

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[88] Loban, _op_. _cit_., p. 86.

[89] Ruddell, _op_. _cit_., pp. 118-119.

[90] Strickland, _op_. _cit_., p. 102.

[91] Loban, _op_. _cit_., p. 86.

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less subordination than the girls in the same group. On the other hand, the boys who were high in oral language ability used more subordination than did the girls. Sampson[92] reported that at ten years of age children in her study of written composition as an aspect of linguistic development, gave an indication of a difference "in the verbal gifts of the two sexes." Harrell,[93] however, stated that his study "found no tendency for girls to excel boys" in either oral or written language. There could be a difference in the understanding which boys or girls have of connectives in reading and the control of the factor has been planned.

From both the studies of Strickland and Loban[94] though, it is evident that those who are good in general reading comprehension should also be those who do well on the test designed to investigate the understanding of connectives. Loban[95] found that the adverb clause differentiated well between those high and low in written language ability, and it may be that this clause type may also differentiate in some way, those who read well.

The second fact emphasized in language studies was the language deprivation which some children can undergo in certain verbal

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[92]Olive C. Sampson, "Written Composition at 10 Years as an Aspect of Linguistic Development," British Journal of Educational Psychology, Vol. 34, June 1964, p. 149.

[93]Harrell, op. cit., p. 70.

[94]Strickland, op. cit., pp. 86-87, 104-105 and Loban, op. cit., p. 85.

[95]Loban, op. cit., p. 59.

environments. These are surroundings where only a certain form of English is spoken. Bernstein's work among the lower working classes showed that the language of these children has a rigidity of syntax and a limited and restricted use of the structural possibilities for sentence organization. He found that they used the "simple conjunctions," such as "so, then, and, and because" and repeated them often in their speech.[96]

Riessman[97] in commenting on the supposed language deficiencies of disadvantaged children reported that these children are not characteristically nonverbal. They have positive verbal ability but the quality of their language does have its limitations and they have a marked deficiency in formal language. This study may reveal that there are some children in particular verbal environments who have not learned the formal language of the textbooks as well as their peers in other residence areas.

There are at least seven or eight factors which are either known to have affected reading and language achievement or which have given some indication that they may have an effect on student scores. Each will be controlled statistically in the study.

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[96]Basil Bernstein, "Social Class and Linguistic Development" - "A Theory of Social Learning," Education, Economy, and Society, eds. A. H. Halsey, Jean Floud, and C. Arnold Anderson, (New York: Macmillan Company, 1961).

[97]F. Riessman, "The Culturally Deprived Child: A New View," Educational Leadership, Vol. 20 (February, 1963), pp. 341-343.

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SUMMARY

This chapter endeavored to provide a background of understanding of connectives in our language. Scholars concerned with languages have indicated their interest in connectives for centuries and in the past decade more queries concerning their nature and function have been posed by investigators of the reading process.

The studies of children's language have produced important facts about subordinate clauses and from an investigation of them several implications about possible problems which could be associated with the reading of connectives in clauses can be isolated.

Connectives have a place in the structure of language and they do contribute to the association of ideas with the development of their use keeping pace with the mental development of children.

The factors of chronological and mental age, occupational status, parental education, and language ability appear to warrant statistical control in the study.

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CHAPTER III

THE ANALYSIS OF SENTENCES OF SELECTED BASAL READERS

Students in grades four, five, and six read a wide range of reading material but much of the formal teaching of reading skills is done through the basal readers. Although reader series do not incorporate sequential lessons in the development of understanding of connectives in clauses, students are subjected to a wide variety of these connectives in many different sentence structures. If children have difficulty understanding connectives, very little is known about it.

To be defensible, a reading test seeking to investigate this area must use these same connectives in some of the same sentence patterns children meet in their basal readers. To substantiate the choice of connectives for this investigation, therefore, and to substantiate their use in sentences of particular structures, an analysis of sentences in selected basal readers was carried out. This analysis was the first phase of the investigation.

Children read extensively in grades four to six, and a representative sample of sentences from all their reading would be very difficult and time consuming to obtain. As a much used method of reading instruction is that which teaches the skill of reading through basal readers, it was decided to limit the sentence sample taken for the analysis to the books of three reader series. Much good teaching

of reading is done through books other than the readers, but many teachers develop a particular reading skill primarily through the reader series. It seemed reasonable and desirable, therefore, to limit the analysis to sentences from these series.

In this chapter after a brief description of the three basal reader series selected for the sentence analysis, an explanation of the forms of connectives and the groups within them will be given. Then an analysis of connectives used in the reader series will be recorded and will be followed by an identification of these connectives by name. The details of the selection of the seventeen connectives for the study will precede the section describing the procedure followed for the analysis of the sentences containing these connectives.

I. SELECTION OF READER SERIES

Three basal reader series were chosen for the analysis, the _Winston Basic Readers_, the _New Basic Readers_, and the _Canadian Parade Readers_. _The Winston Readers_ are part of an inclusive communication program which integrates the oral and written language skill development with that of reading. Each unit of the readers contains a special section in which articles about science, industry, music, etc. are included, thus, making available for the study a wider variety of vocabulary and writing styles.

A widely used series, the New Basic Readers of the Curriculum Foundation Series, (Canadian Edition) offers a broad selection of stories spanning many eras of time, authors, and interests. These basal readers also present a number of sentence patterns seldom used by children in their oral language[1] giving an opportunity to compare the series' use of connectives with the other two series.

An older series authorized for use in several Canadian provinces, the Canadian Parade Readers contain many selections written by Canadian authors about Canadian people and places. The series aims to give a definite impression of ideals of the Canadian way of life through a careful organization of material, which presents themes through historical, geographical, health, and science selections. A number of stories in each book are from the writings of well known authors of the English speaking world. These three series cover a wide variety of reading material and were considered representative of the basal readers through which students in grades four, five, and six are being taught the skill of reading.

The following books were the basal readers for grades four to six in the three series selected for this investigation:

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[1] Ruth G. Strickland, The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children (Bloomington: School of Education, Indiana University, 1962), Vol. 38, No. 4, p. 70.

Series	Date of Latest Printing	Grade	Name of Reader
Winston Basic Readers	1961	4	1. Around the Bend 2. Above the Clouds
		5	Through the Years
		6	Skyways to Tomorrow
The New Basic Readers (Canadian Edition)	no date given	4	The New Times and Places
		5	The New Days and Deeds
		6	The New People and Progress
Canadian Parade Readers	1953	4	Young Explorers
		5	Gay Adventurers
		6	Proud Procession

Throughout the remainder of the study the Winston Basic Readers will be called Series A, the New Basic Readers, Series B, and the Canadian Parade Readers, Series C.

The sentences for analysis were taken from every twentieth page of all of these books. Starting from the first complete sentence at the top of the page all sentences within a minimum of one hundred running words were noted. Only the sentences contained in stories and plays were used. The poetry selections were excluded as particular problems such as word order inversion were considered outside the scope of this study. When a selection of poetry was encountered, the first prose selection to appear after the poetry, was

taken for the sample of sentences. Twenty non-sentences were identified. These were groups of words such as captions and titles which were outside the definition used for a sentence in the study. Two such non-sentences were tallied in each of Series A and Series B with the remaining sixteen non-sentences from Series C.

II. THE FORMS OF THE CONNECTIVES

A connective was defined in Chapter I, as a linguistic form that connected a clause to another clause or some word in it on the printed page. Of the two forms of connectives identified, one-word connectives and phrasal connectives, only the former was studied in this investigation. Therefore, the term "connective" refers only to one-word connectives unless the context specifies otherwise.

Phrasal Connectives

Phrasal connectives were of the type "but because" or "and when" where two one-word connectives followed each other. If two such connectives were separated by a comma, they were considered as two separate one-word connectives and were accepted for the investigation. For example, in the two sentences below, "for if" was tallied as a phrasal connective and the sentence was not included in the sentence analysis, but "for, if" was counted as two separate one-word connectives, and the sentence was used in the study.

"He sniffed and sniffed like a bear, for if a bear can smell a man, maybe a man can smell a bear." (Series B, Bk. 5, p. 180).

"Henri and Julie were tired too, for, if they did not hold it, the cart tipped." (Series C, Bk. 4, p. 13).

Another type of phrasal connective excluded from this study was the correlative in which one word(s) of the phrasal is separated from the other word(s) of the connective by another word or group of words. "Either...or" and "not only...but also" were examples of correlatives which were not included in this study.

<u>One-Word Connectives</u>

Two groups of one-word connectives were identified: those which linked clauses to other clauses or words in them within a sentence and secondly, those which connected sentences.

<u>Group 1</u>. Those connectives which linked clauses to words or groups of words within a sentence were in two classes:

<u>Class A</u>. These were connectives attached to clauses which function in the sentences as nouns, adjectives, or adverbs. That is, the clause to which these connectives were attached was subordinate to another clause in the sentence. These connectives form two sub-classes:

1. The connectives which had no other function in the particular group of words than that of introducing the words of the clause were the

first sub-class. The clauses of which they were a part function as nouns, adjectives, or adverbs but the connective in the clause serves only to introduce the clause as a subordinate part of another clause. Because these connectives only function to include the subordinate clause in another clause in the sentence they will be called simple includer subordinate clause connectives. The connectives from this group investigated in the study are: although, because, if, so, that, when, where. An example is:

> "She knew that he had been enchanted!"
> (Series B, Bk. 4, p. 200)

The subordinate clause functions as a noun in the sentence and the connective "that" works only to introduce the clause.

2. The connectives which had a function in the clause in addition to that of introducing the particular group of words, the clause, were the second sub-class. These connectives will be called relative pronoun subordinate clause connectives. In the study these connectives are: that, which, who. An example is:

> "He dragged the harrows and heavy rollers
> that break up the big pieces of earth to
> make a softer bed for the little seed."
> (Series C. Bk. 4, p. 266).

"That" functions as subject of the subordinate clause in addition to introducing the clause.

Class B. The connectives attached to clauses which do not function within the sentence as a noun, adjective, or adverb, are members of this class. They connect clauses to words or groups of words which are not subordinate to another clause in the sentence. These connectives will be called co-ordinate clause connectives and those chosen for the study are: and, but, for, yet. On occasion these connectives also join one sentence with another. An example from page 180, Bk. 5 of Series C follows:

"Out came her hand, and there were two shining coins."

and

"Why, Nisseman, look here!" she cried. "I have two coins in my pocket."

"And at the same time her brother brought two out of his own pocket."

The one-word connectives which were absent although the words or groups of words being connected were present, were a special case of the subordinate clause connectives. For example, in the sentence, "The corn the donkey had saved each month had turned to gold." (Series A, Bk. 4, p. 40), the group of words, "the donkey had saved each month" is connected to "the corn...had turned to gold" but the

[illegible]

[illegible]

> [illegible]

> [illegible]

> [illegible]

> [illegible]

[illegible]

connective is not present. The word "that" is one word that could be acceptably used as a connective in this sentence but it is absent. The word "absent" is meant to relay the meaning that in the construction of this sentence a connective could have acceptably introduced the words "the donkey had saved each month." However, the connective is not present, it is absent. There is no proof that a connective should have been used nor is this suggested. A connective could have been used, as it has been in other sentences of similar construction. The purpose of including this construction in the investigation is to attempt to ascertain if the absence of the connective hinders the understanding of the student in reading. As the connective is absent, it cannot be said to have form, so it is entered as a special case of the Group I, Class A, one-word connectives.

For this study a special term for these connectives has been coined. They will be called "absent" connectives and any item in the reading test constructed to test pupil understanding of connectives in which the connective is absent, the word "that" can be appropriately inserted. This "absent" connective will be referred to as one of the seventeen selected connectives.

<u>Group II</u>. The linguistic forms which connected one sentence with another and which had no function as noun or adjective, in the sentence, formed this group called sentence linkers. Those investigated in the study are: however, thus, Series C, Bk. 6, p. 400, provides an example.

"As it moves out of the range of the English station, it will come into the range of the American station. Thus a boat can remain in contact with land for its entire voyage."

Table I summarizes the forms of the connectives, and the groups and classes of the one-word connectives.

III. ANALYSIS OF CONNECTIVES USED IN READERS

The sentence sample was subjected to a variety of counts to find out how many sentences contained connectives, the number of connectives in them, their form, and the combination of connectives found.

The Number of Sentences with Connectives

The distribution of connectives by grade and by reader series is shown in Table II and provides the basis for the more detailed analyses of Tables III to VII inclusive.

Table II indicates that more than one-third of the sentences in the basal readers contain connectives. Three-quarters of these sentences have one connective while the remaining one-quarter contain at least two of them. This investigation then, is concerned with linguistic forms which occur in 36.99 per cent of the written language children read in their readers.

The variation in the percentage of sentences* containing connectives is almost negligible from grade to grade with only a little more than 2 per cent of sentences in grade four containing single

*See page 70.

TABLE I

SUMMARY OF THE CONNECTIVE FORMS: THE GROUPS AND CLASSES OF THE ONE-WORD CONNECTIVES

Connective Forms	Groups of Connectives	Classes of Connectives	Sub-classes of Connectives and Names of Connectives Investigated in this Study
One-Word Connectives (The connective is present in graphic form)	I. Those connecting a clause to another clause or some word in it on the printed page.	A. Subordinate Clause connectives	1. Simple includer: - although, because, if, so, that, when, where.
			2. Relative pronoun: - that, which, who
		B. Co-ordinate Clause Connectives	- and, but, for, yet
	II. Those connecting one sentence with another		- however, thus
One-Word Connective (The connective is not present in graphic form but the connective "that" could be appropriately inserted).		Subordinate Clause Connective	"Absent": "that"

Phrasal Connectives: As these connectives were outside the scope of the study, no groups or classes were defined for them.

TABLE II

DISTRIBUTION OF CONNECTIVES IN SENTENCE SAMPLE BY GRADE AND BY READER SERIES*

Grade	Reader Series	Total Number of Sentences in Sample	Sentences with Connectives		Sentences with One Connective Only		Sentences with More Than One Connective	
			No.	Per Cent	No.	Per Cent	No.	Per Cent
4	A	364	139	38.19	113	81.29	26	18.71
	B	263	98	37.26	78	79.59	20	20.41
	C	253	98	38.74	66	67.35	32	32.65
	Total	880	335	38.07	257	76.72	78	23.28
5	A	164	67	40.85	54	80.60	13	19.40
	B	309	117	37.86	92	78.63	25	21.37
	C	366	121	33.06	82	67.77	39	32.23
	Total	839	305	36.35	228	74.75	77	25.25
6	A	213	60	28.17	54	90.00	6	10.00
	B	277	125	45.13	96	76.80	29	23.20
	C	378	132	35.11	86	65.15	46	34.85
	Total	868	317	36.52	236	74.45	81	25.55
Totals by Grades and Series		2,587	957	36.99	721	75.34	236	24.66
	Series A	741	266	35.90	221	83.08	45	16.92
	Series B	849	340	40.05	266	78.24	74	21.76
	Series C	997	351	35.21	234	66.67	117	33.33

* "Absent" connectives are included in the connective counts and in the calculations of the percentages in Tables II - VII inclusive.

*Extract from Table II

Grade	Reader Series	Total Number of Sentences in Sample	Sentences with Connectives		
			No.	Per Cent	Per Cent
(1)	(2)	(3)	(4)	(5)	(6)
4	A	364	139	38.19 $\left(\frac{139}{364} \times 100\right)$	41.50 $\left(\frac{139}{335} \times 100\right)$
	B	263	98	37.26	29.25
	C	253	98	38.74	29.25
	Total	880	335	38.07 $\left(\frac{335}{880} \times 100\right)$	

Comparisons among reader series have been made on percentages computed on the counts from a particular reader series. Large numbers in the tables are the result of tallies in readers with many pages in them or the provision of two readers at one grade level as in Series A, grade four. Therefore, the percentages have been computed on the basis of the number of sentences in a Reader Series (column 5 of the "Extract from Table II) rather than on the total number of sentences with connectives in them (column 6 of the Extract from Table II).

The general percentages at a grade level (i.e. the total for grade four, not Series A grade four, etc.) have been computed from the total number of sentences at the grade level instead of taking an average of the percentages of the three series. For example, in Table I, the sentences having connectives in grade four is 38.07 per cent, and was calculated as 335 in 880 sentences. If the per cent in each of the reader series had been averaged, a less accurate figure of 38.06 would be tallied as each of the per cents in the tables of this chapter have been rounded off to two decimal places. The same procedure has been followed in Tables III to VII inclusive.

connectives than those in grades five and six. Investigators[2] consistently report that in both oral and written language children show a significant increase in their use of sentences containing connectives as their chronological age increases. Adults writing in the readers for the children do not appear to take this into account as there is very little difference from grade to grade and what difference does exist is in favor of the lowest of the three grades.

Although Series A and Series C have almost the same percentage of sentences with connectives, Series A has about 17 per cent more one-connective sentences and a corresponding per cent less of multi-connective sentences. If the students do have trouble comprehending the connectives, Series C may present more difficulty than either of the other two series, and Series A may be a little easier.

At the grade four level the three series present almost exactly the same percentage of sentences with connectives in them but in both of the two higher grades a difference of as much as 7 per cent is noted. If the joining of ideas together with connectives is one way of increasing complexity in sentence structure,

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[2]Lou L. LaBrant, "A Study of Certain Language Developments of Children in Grades Four to Twelve Inclusive," Genetic Psychological Monograph, 14, 1933, pp. 387-491; and A. F. Watts, The Language and Mental Development of Children: An Essay in Educational Psychology (London: George G. Harrap & Co., Ltd., 1944), pp. 72-84.

one would expect that in a basal reading series the percentage of connectives would increase from grade to grade. Only in Series B is there a consistent increase in the number of sentences with connectives. It is reasonable to expect also, that in the sentences with connectives, the one-connective sentences would decrease in favor of a proportionate percentage rise in the number of multi-connective sentences. Such is the case in a very limited degree in both Series B and Series C.

One Connective Sentences

The sentences containing one connective each were further analysed by grade level and basal reader series to find out what portion of them contained one-word, phrasal, or "absent" connectives.

Table III shows that 81.42 per cent of the one-connective sentences contain one-word connectives with 6.24 and 12.34 per cent for the phrasal and "absent" connectives respectively. The greater percentage of one-word connectives is concentrated at the grade five level, 11 per cent more than at the grade four level. The highest percentage of "absent" connectives is concentrated at grade four with a steady decrease noted on each higher grade level. If students find the comprehension of groups of words difficult when the connective is absent, they are faced with the greatest percentage of them at the lowest grade level. No consistent pattern of distribution is evident among the phrasal connectives.

TABLE III

DISTRIBUTION OF FORMS OF CONNECTIVES IN SENTENCES CONTAINING ONE CONNECTIVE BY GRADE AND BY READER SERIES

Grade	Reader Series	Sentences with One Connective	One Connective Sentences with a: One-Word Connective No.	One-Word Connective Per cent	Phrasal Connective No.	Phrasal Connective Per cent	"Absent" Connective No.	"Absent" Connective Per cent
4	A	113	75	66.37	9	7.97	29	25.66
	B	78	64	82.05	4	5.13	10	12.82
	C	66	55	83.33	5	7.58	6	9.09
	Total	257	194	75.49	18	7.00	45	17.51
5	A	54	47	87.04	2	3.70	5	9.26
	B	92	81	88.04	4	4.35	7	7.61
	C	82	69	84.15	0	0.00	13	15.85
	Total	228	197	86.40	6	2.63	25	10.97
6	A	54	49	90.74	1	1.85	4	7.41
	B	96	84	87.50	5	5.21	7	7.29
	C	86	63	73.26	15	17.44	8	9.30
	Total	236	196	83.05	21	8.90	19	8.05
Totals by Grades and Series		721	587	81.42	45	6.24	89	12.34
	Series A	221	171	77.38	12	5.43	38	17.19
	Series B	266	229	86.09	13	4.89	24	9.02
	Series C	234	187	79.91	20	8.55	27	11.54

Series A contains the smallest percentage of one-word connectives and the greatest percentage of "absent" connectives, with Series B tallying the reverse. Both these series have strong trends towards greater percentages of one-word connectives in each higher grade than in the lower one. Series C reverses that trend in grade six with a sharp decrease in the percentage of one-word connectives in favor of a 17 per cent jump from the number of phrasal connectives used in the grade five book.

Table IV shows that the distribution of the multi-connective sentences from grade to grade varies only about 2 per cent. There is, however, a decisive difference among the three series. Series A contained 16.92 per cent of the total number of multi-connective sentences, Series B, 21.76 per cent, and Series C, 33.33 per cent.

Of the sentences which are multi-connective, 76.27 per cent of them contain two connectives only. In grade four, 82.05 per cent of the sentences have two connectives, in grade five, 75.32 per cent, and in grade six, 71.61 per cent. This decrease is counterbalanced by a corresponding increase in the number of both three and four-connective sentences. The percentage of sentences with three connectives outnumbers those with four or more connectives in them by six to one in grade four and two to one in grade six. If an increase in the number of ideas connected in a sentence increases the complexity of the sentence, this pattern of change whereby sentences with more connectives in them are presented in greater numbers in each higher grade would seem desirable.

TABLE IV

DISTRIBUTION OF SENTENCES WITH MORE THAN ONE CONNECTIVE
BY GRADE AND BY READER SERIES

Grade	Reader Series	Sentences with More than One Connective	Sentences with: Two Connectives		Three Connectives		Four or More Connectives	
			No.	Per cent	No.	Per cent	No.	Per cent
4	A	26	21	80.77	5	19.23		
	B	20	17	85.00	3	15.00		
	C	32	26	81.25	4	12.50	2	6.25
	Total	78	64	82.05	12	15.39	2	2.56
5	A	13	11	84.62	1	7.69	1	7.69
	B	25	21	84.00	4	16.00		
	C	39	26	66.67	10	25.64	3	7.69
	Total	77	58	75.32	15	19.48	4	5.20
6	A	6	6	100.00				
	B	29	24	82.76	3	10.34	2	6.90
	C	46	28	60.87	13	28.26	5	10.87
	Total	81	58	71.61	16	19.75	7	8.64
Totals by Grades and Series		236	180	76.27	43	18.22	13	5.51
	Series A	45	38	84.45	6	13.33	1	2.22
	Series B	74	62	83.79	10	13.51	2	2.70
	Series C	117	80	68.38	27	23.08	10	8.54

The same regular pattern of change is not followed, however, in each series. Series A reverses the pattern noted by grade levels and has the smallest percentage of two-connective sentences at the grade four level but the highest percentage of three-connective sentences. Both Series B and Series C more consistently follow the pattern of presenting the sentences with the most connectives in them in the higher grade.

Series C contains about 15 per cent less of the two-connective sentences than Series A and B with 10 per cent more of the three-connective sentences and 6 per cent more of the four-or-more-connective sentences. There is an indication, therefore, that the books of Series C may be harder to read for children who have trouble understanding the connectives.

Two Connective Sentences

Of the sentences which contain two connectives, 69.44 per cent of them contain two one-word connectives. This sentence, "When Aunt Lizzie Gordon heard her nephew's report, she said that the visitors were not to be harmed." (Series B, Bk. 4, p. 320), is an example. Table V shows that the remaining one-third are distributed over various two-connective combinations with the one-word-one-"absent" connective combination accounting for the greater proportion of the remainder. A sample of such a combination is this sentence: "He'd heard they were wanting cat-skinners

TABLE V

DISTRIBUTION OF FORMS OF CONNECTIVES IN SENTENCES CONTAINING TWO CONNECTIVES BY GRADE AND BY READER SERIES

Grade	Reader Series	Sentences with Two Connectives	Two-Connective Sentences Which Have Only: One-Word Connectives		Phrasal Connectives		"Absent" Connectives		One-Word and One-Phrasal Connective Combinations		One-Word and One-"Absent" Connective Combinations		One-Phrasal and One-"Absent" Connective Combinations	
			No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
4	A	21	10	47.62					2	9.52	6	28.57	3	14.29
	B	17	10	58.83	1	5.88	1	5.88	1	5.88	4	23.53		
	C	26	20	76.92					1	3.85	5	19.23		
	Total	64	40	62.50	1	1.56	1	1.56	4	6.25	15	23.44	3	4.69
5	A	11	7	63.64					1	9.09	3	27.27		
	B	21	13	61.90					4	19.05	4	19.05		
	C	26	22	84.62							4	15.38		
	Total	58	42	72.41					5	8.62	11	18.97		
6	A	6	5	83.33					1	16.67				
	B	24	17	70.83							7	29.17		
	C	28	21	75.00					2	7.14	4	14.29	1	3,57
	Total	58	43	74.14					3	5.17	11	18.97	1	1.72
Totals by Grades and Series		180	125	69.44	1	0.56	1	0.56	12	6.67	37	20.55	4	2.22
	Series A	38	22	57.89					4	10.53	9	23.68	3	7.90
	Series B	62	40	64.52	1	1.61	1	1.61	5	8.07	15	24.19		
	Series C	80	63	78.75					3	3.75	13	16.25	1	1.25

[illegible]

up at the lumber camp at the head of Horse Creek which was only a couple of hours' ride." (Series C, Bk. 5, p. 241). The two one-word connectives increase in percentage from grade four to grade six while the one-word-one-"absent" connective combination decreases over the three grade span. Series A uses the two one-word connectives the least, distributing more than 40 per cent of their two-connective combinations among three other possible combinations of two connectives. Series C uses the two one-word connectives more than 78 per cent of the time making very limited use of other possible combinations of connectives.

Three Connective Sentences

The sentences with three connectives which account for 18.22 per cent of the multi-connective sentences (Table IV, p. 75), are shown in Table VI to be divided almost equally from grade to grade. Series A has the least number of such sentences - six, while Series B has ten, and Series C has the greatest number - twenty-seven sentences. The sentences with three one-word connectives account for almost half the percentage while combinations of one-word-"absent" connectives make up about one-third of the total number of three-connective sentences. Series C has the widest range of connective combinations and Series B the most restricted.

TABLE VI

DISTRIBUTION OF FORMS OF CONNECTIVES IN SENTENCES CONTAINING THREE CONNECTIVES BY GRADE AND BY READER SERIES

			Three-Connective Sentences Which Have:									
Grade	Reader Series	Sentences with Three Connectives	One-Word Connectives only		"Absent" Connectives only		One-Word and Phrasal Connective Combinations		One-Word and "Absent" Connective Combinations		One-Word, Phrasal and "Absent" Connective Combinations	
			No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
4	A	5					1		3		1	
	B	3	3									
	C	4	2						2			
	Total	12	5	41.67			1	8.33	5	41.67	1	8.33
5	A	1	1									
	B	4	3						1			
	C	10	2		1				6		1	
	Total	15	6	40.00	1	6.67			7	46.66	1	6.67
6	A											
	B	3	2				1					
	C	13	7				2		2		2	
	Total	16	9	56.25			3	18.75	2	12.50	2	12.50
Totals by Grades and Series		43	20	46.51	1	2.33	4	9.30	14	32.56	4	9.30
Series A		6	1	16.67			1	16.67	3	50.00	1	16.67
Series B		10	8	80.00			1	10.00	1	10.00		
Series C		27	11	40.74	1	3.70	2	7.41	10	37.04	3	11.11

Four or More Connective Sentences

Table VII shows the distribution of the sentences which contain four or more connectives, only 1 per cent of those which contain connectives. Their distribution varies from two sentences found in books at the grade four level to seven sentences at the grade six level. Series C had almost all of them, claiming ten out of the thirteen identified.

Summary

The connectives, then, are found in about 37 per cent of the sentences which the children read in these basal readers. Three-quarters of these sentences contain one connective only with the remaining one-quarter containing two or more connectives.

The distribution of these connectives among the grade levels does not appear to follow any pattern consistently. No sequential program for the introduction of the three forms of connectives with the sentences is apparent from one grade level to the next. Nor is there any clearly defined pattern for the progressive introduction of single and multi-connective sentences.

A similar distribution of connectives is noted among the three series of basal readers. No apparent control has been exerted over the introduction of the number of connectives or of their combinations from one grade level to another.

TABLE VII

DISTRIBUTION OF FORMS OF CONNECTIVES IN SENTENCES CONTAINING FOUR OR MORE CONNECTIVES BY GRADE AND BY READER SERIES*

			Four-or-More-Connective Sentences Which Have:			
Grade	Reader Series	Sentences with Four or More Connectives	One-Word Connectives only	One-Word and Phrasal Connective Combinations	One-Word and "Absent" Connective Combinations	One-Word, Phrasal, and "Absent" Connective Combinations
4	A					
	B					
	C	2			2	
	Total	2			2	
5	A	1			1	
	B					
	C	3	2			1
	Total	4	2		1	1
6	A					
	B	2		2		
	C	5	1	2	1	1
	Total	7	1	4	1	1
Totals by Grades and Series		13	3	4	4	2
	Series A	1			1	
	Series B	2		2		
	Series C	10	3	2	3	2

*The following connective combinations were not found in the sentence sample: four or more phrasal connectives only, four or more "absent" connectives only, or four or more "absent" and phrasal connective combinations.

IV. THE IDENTIFICATION OF THE INDIVIDUAL CONNECTIVES IN THE READERS

From the information gathered in the preceding section a count of the particular connectives and their distribution by grade and reader series was made. Tables II to VII were all based on the sentences containing the connectives but Table VIII and those following it, are based on the connectives themselves.

As the phrasal connectives were only seventy-seven in number, 6.07 per cent of the total number of connectives, they were dropped from the study at this point. Their form, units of two words together or separated one from the other as in a correlative, presented some special problems which were considered to be outside the scope of this study.

There were 1,268 connectives in the sentence sample (Table VIII). Of these 80.99 per cent were one-word connectives and 12.94 per cent were "absent" connectives, a total of 1,191 connectives after the phrasal connectives were deleted. The distribution of these one-word and "absent" connectives is shown in Table IX according to their frequency of occurrence by grade level and reader series.

Of the 1,191 connectives in the sentences, 86.23 per cent of them are one-word connectives with 13.77 per cent of them "absent" connectives. By grade there is a slight 4 - 5 per cent increase in

TABLE VIII

SUMMARY OF THE DISTRIBUTION OF ONE-WORD, PHRASAL, AND "ABSENT" CONNECTIVES BY GRADE AND READER SERIES

Grade	Reader Series	Total	One-Word Connectives	Phrasal Connectives	"Absent" Connectives
4	A	170	111	16	43
	B	121	98	7	16
	C	138	117	6	15
	Total	429	326	29	74
5	A	83	71	3	9
	B	146	126	8	12
	C	176	144	2	30
	Total	405	341	13	51
6	A	66	60	2	4
	B	164	142	8	14
	C	204	158	25	21
	Total	434	360	35	39
Totals by Grades and Series		1,268	1,027 (80.99%)	77 (6.07%)	164 (12.94%)
Series A		319	242	21	56
Series B		431	366	23	42
Series C		518	419	33	66

TABLE IX

DISTRIBUTION OF ONE-WORD AND "ABSENT" CONNECTIVES BY GRADE AND READER SERIES

Grade	Reader Series	Total No. of One-Word and "Absent" Connectives	One-Word Connectives No.	One-Word Connectives Per cent	"Absent" Connectives No.	"Absent" Connectives Per cent
4	A	154	111	72.08	43	27.92
	B	114	98	85.96	16	14.04
	C	132	117	88.64	15	11.36
	Total	400	326	81.50	74	18.50
5	A	80	71	88.75	9	11.25
	B	138	126	91.30	12	8.70
	C	174	144	82.76	30	17.24
	Total	392	341	86.99	51	13.01
6	A	64	60	93.75	4	6.25
	B	156	142	91.03	14	8.97
	C	179	158	88.27	21	11.73
	Total	399	360	90.23	39	9.77
Totals by Grades and Series		1,191	1,027	86.23	164	13.77
	Series A	298	242	81.21	56	18.79
	Series B	408	366	89.71	42	10.29
	Series C	485	419	86.39	66	13.61

the number of one-word connectives from one grade level to another and a corresponding decrease in the percentage of "absent" connectives. The same pattern of distribution is found in the reader series with the exception of Series C where the percentage of one-word connectives is the same for grades four and six with about a 6 per cent increase in grade five. Series A has the lowest percentage of one-word connectives, 81.21 per cent, while Series C has about 5 per cent more than Series A, and Series B, about 8 per cent more than Series A. If the "absent" connectives are a source of trouble in reading comprehension, the youngest group in grade four is faced with the greatest percentage of them in their reading material.

Table X reveals that the forty-two connectives identified had frequencies varying from nearly 14 per cent to less than 1 per cent of the total number of connectives found in the sentence analysis. Half of the forty-two connectives have frequencies of ten or less, and three-quarters of them occur less than thirty-one times each in the sentences studied. No consistent pattern of distribution for a particular connective is discernible by grade level or by reader series. There appears to have been no thought by the writers of these readers of introducing certain connectives at various stages and then providing opportunity for development in the skill of reading them.

Although Series A appears to have many fewer connectives than either of the other two series, a second reference to Table II, page 69, will show that Series A and Series C actually contain the

TABLE X

DISTRIBUTION OF INDIVIDUAL CONNECTIVES IN THE READER SERIES

Connective	Frequency of Occurrence	Grade			Reader Series		
		4	5	6	A	B	C
*"absent" connective	164	74	51	39	56	42	66
*and	147	47	51	49	23	39	85
*but	126	44	46	36	34	49	43
*that (simple includer)	125	34	44	47	29	59	37
as	95	36	24	35	19	44	32
*when	74	25	22	27	17	29	28
*that (relative pronoun)	63	15	16	32	17	28	18
*if	46	19	14	13	13	13	20
*who	37	5	14	18	12	11	14
*so	35	13	15	7	3	12	20
what	31	9	11	11	10	4	17
before	25	6	8	11	9	7	9
*where	25	8	9	8	5	12	8
*which	23	6	6	11	5	2	16
then	20	8	6	6	4	7	9
while	19	5	7	7	3	8	8
*because	18	8	4	6	5	8	5
how	17	4	8	5	7	5	5
now	13	5	4	4	4	0	9
until	11	6	3	2	5	1	5
*for	11	4	4	3	0	5	6

TABLE X (continued)

Connective	Frequency of Occurrence	Grade			Reader Series		
		4	5	6	A	B	C
than	10	1	3	6	4	6	0
though	9	4	2	3	2	2	5
*yet	5	1	2	2	2	2	1
*although	5	1	4	0	1	4	0
or	4	1	2	1	2	1	1
*however	3	0	3	0	1	1	1
besides	3	1	0	2	0	1	2
*thus	3	0	0	3	0	2	1
unless	3	1	2	0	1	1	1
whom	3	1	2	0	1	0	2
whose	3	1	1	1	1	0	2
till	3	2	1	0	0	0	3
why	2	0	1	1	0	1	1
after	2	2	0	0	1	0	1
since	2	1	0	1	1	0	1
nevertheless	1	0	0	1	0	0	1
nor	1	0	0	1	0	0	1
like	1	1	0	0	1	0	0
whenever	1	0	1	0	0	1	0
where'er	1	0	1	0	0	0	1
either	1	1	0	0	0	1	0
Totals	1,191	400	392	399	298	408	485

*The connectives starred are those chosen for further investigation in this study.

same percentage of sentences with connectives in them. However, Series A has an appreciably higher percentage of one-connective sentences than Series C while the latter has double the percentage of sentences with more than one connective in them. By packing the sentences with more connectives, Series C does build up a substantially larger total of connectives in its sentences.

Three facts are apparent. From Table X, it can be seen that:

1. There are a large number of connectives used in the reader series and that they are widely distributed throughout the three grade levels and the three reader series.

2. The totals for the grade levels indicate that there is very little difference in the numbers of connectives in the readers from grade to grade. This table shows 400 connectives in grade four; 392 in grade five; and 399 in grade six. The total number of times an individual connective may appear in the readers does vary from grade to grade, however, with the greatest frequency likely to occur at any one of the three grade levels.

3. There are broad consistent lines of distribution drawn among the three reader series. In Table X, approximately the same connectives have frequencies of twenty or more, ten to twenty and less than ten, in the same series and across the three grade levels. Within these broad categories the frequency of usage can vary from series to series as much as sixty-two times in the distribution of the connective "and" to no difference in "however," or as little as two times in the distribution of "who."

V. THE SELECTION OF CONNECTIVES FOR THIS INVESTIGATION

From the forty-two connectives identified, seventeen were chosen for further study. The choice was influenced by a number of factors among which the following will be summarized in this section: the frequency of occurrence in the basal reader sentence analysis, the multiplicity of meanings the connectives have, the homographs of the connectives, the findings of previously published research and the classes to which the connectives belong. A few of these facts have been summarized in Table XI.

The frequency of occurrence of the connective was a factor of prime importance in the selection of the connectives for further investigation, as it is logical to investigate in reading those connectives which the children have to read more often. The frequency of the seventeen connectives chosen amounted to 910 out of 1,191, the total frequency of the forty-two connectives. Thus 76.41 per cent of the connectives appearing in the basal readers were included in the further study. To ensure more complete coverage of the classes of connectives two sentence linkers, "however," and "thus" were chosen even though their frequency of occurrence would not have warranted their selection otherwise. Both the connectives, "yet" and "although" were chosen because they possessed a feature not covered by any other connective in their particular categories,

TABLE XI

SOME FACTORS INFLUENCING THE CHOICE OF CONNECTIVES

Connectives by Class	Frequency of Occurrence in Sentence Analysis Single	Comb.	Total	Multiplicity of Meanings of Connectives	Multiplicity of Functions of Connectives and Homographs	Unique Features of Connectives
I. Connectives which Link Clauses in a Sentence						
A. Subordinate Clause Connectives						
1. Simple Includers						<u>Expresses</u>:
although	3	2	5	1	1	- concession
because	6	12	18	3	1	- causal relations
if	21	25	46	7	3	- condition, purpose
so	18	17	35	6	6	- result
that	57	68	125	15	6	- provides opportunity to compare with "that" as relative pronoun, and "absent" connectives
when	40	34	74	6	4	- time
where	15	10	25	10	4	- space
2. Relative Pronouns						<u>Substitutes as</u>:
that	40	23	63	4	6	- referent for people and things
which	9	14	23	1	2	- referent for non-persons
who	20	17	37	1	2	- referent for persons
B. Co-ordinate Clause Connectives						
and	92	55	147	23	3	- has greatest number of meanings
but	72	54	126	10	8	- has greatest number of functions
for	5	6	11	1	5	- for comparison with "because"
yet	3	2	5	2	3	- has one meaning of "but" and one of "although"

TABLE XI (continued)

Connectives by Class	Frequency of Occurrence in Sentence Analysis Single	Comb.	Total	Multiplicity of Meanings of Connectives	Multiplicity of Functions of Connectives and Homographs	Unique Features of Connectives
"Absent" Connective -	Special case of subordinate clause connectives					
	83	81	164	15	6	- to appraise pupil's understanding of clause when connective is "absent"
II. Connectives which Link Sentences						Expresses:
however	3	0	3	3	1	- reservation after concession or decision
thus	2	1	3	4	2	- explanation with concession or decision
Totals	489	421	910			

that of concession. The connective "as" although of high frequency in comparison to others chosen for further study was not included here because by nature it is often used as a phrasal connective, a form excluded from this study.

The counts for the multiplicity of meanings a connective may have, were based on the information given in the Merriam-Webster Third International Dictionary. There being no comparable reference either for completeness of information or for definiteness of meanings and functions of these connectives, this dictionary was taken as the basis upon which to judge both meanings and functions of the seventeen connectives. Following the procedure laid out in the preface to the dictionary, the sense or the meanings of the word were tallied, (Table XI). Archaic and obsolete meanings were not counted as it is unlikely that the children would meet them in present day writings.[3] "Archaic" was defined as standard after 1755 but surviving in the present only sporadically or in special contexts, and "obsolete" as no evidence of standard use since 1755 has been found or is likely to be found. It is conceded that some function words have little or no semantic content and therefore, usage notes were given in the dictionary rather than definitions. Because these

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[3]Philip Babcock Gove (ed.), Webster's Third New International Dictionary of the English Language Unabridged (Springfield: G & C Merriam Company, 1964), pp. 6a, 18a, 19a.

usages do differ one from the other, for the purposes of this study, they have been tallied as though they had been listed as additional definitions. Even then, there were some very difficult arbitrary decisions to be made with unnumbered sub-usages, for example, the case of the connective "which."

From the same dictionary the functions of the homographs of the connectives were noted, (Table XII). It will be observed from Table XII that the function of the word as an abbreviation has been included, because children do come in contact with them in their reading. Traditional use follows the abbreviation with a comma but there appears to be a trend to use some of these abbreviations without punctuation. The use of "so" for "south" is a well known abbreviation bearing the same linguistic form as the connective "so" while "for" as a short form for "foreign" is less known.

The findings of previously published research strongly influenced the choice of connectives for further study. The details of these considerations are found in Chapter II based on the findings in the three areas of oral and written language, reading, and cognitive development.

A representation from each of the classes of connectives was considered essential for the scope of the study so a better understanding of any problems children may have with each of these connective classes is then possible.

TABLE XII

THE FUNCTIONS OF THE HOMOGRAPHS OF THE CONNECTIVES

Connective	Conjunction	Noun	Abbreviation	Preposition	Adverb	Pronoun	Combination Form	Variation	Prefix	Adjective	Total Functions of Connectives and their Homographs
although	XC										1
because	XC										1
if	XC	X	X								3
so	XC		X		X	X		X		X	6
that	XC	X			X	X, XC				X	6
when	XC	X			X	X					4
where	XC	X			X	X					4
which						XC				X	2
who		X				XC					2
and	XC	X	X								3
but	XC	X		X	X	X	X	X		X	8
for	XC	X	X	X					X		5
yet	XC				X					X	3
however					XC						'1
thus		X			XC						2
Totals	11	9	4	2	8	8	1	2	1	5	51

The class of subordinate clause connectives, provided an opportunity for the investigation of the simple includer subordinate clause connectives, the special case of the "absent" connective (that), and the relative pronoun subordinate clause connectives. Among the simple includers there are a variety of relations expressed giving an opportunity to assess whether the student can read with understanding relationships of time, space, concession, etc. The choice of the three "thats" provided for a comparison of understanding of the two homographs and the effect of the absence of one of them. The three connectives of the relative pronouns sub-class probe the student's ability to correctly refer to persons and things.

The class of co-ordinate clause connectives investigates the connectives with the greatest number of meanings and of homographs too. There is an opportunity to compare the use of "for" with that of "because." The word "yet" which is also used as both adjective and adverb, carries two meanings, one of "but" and one of "although". Complexities of this nature helped to warrant the choice of the four co-ordinate clause connectives in this study.

The second group of connectives, those which link sentences, give an opportunity for the student to work beyond an individual sentence.

VI. THE ANALYSIS OF SENTENCES CONTAINING THE SELECTED CONNECTIVES

Following the selection of connectives for further study, all of the sentences which contained these connectives only, were analysed. This section will explain how the analysis of one sentence was done; the procedure for the analysis of the entire group of sentences; and the extraction of a sentence pattern for use in the construction of a test item.

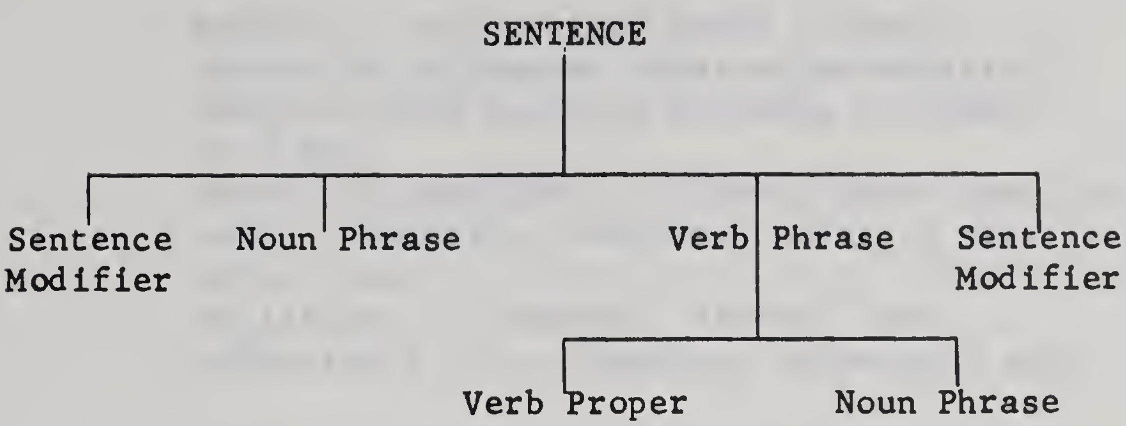
Analysis of One Sentence

The analysis of a single sentence was divided into three sections, each occupying adjacent columns of a large rule sheet.

The three parts were:

1. The noun phrase: The subject and all of its modifiers.
2. The verb phrase:
   a. The verb proper and its modifiers.
   b. The object or complement and its modifiers.
3. The sentence modifier: Spaces were left both at the beginning and at the end of the sheet for words, phrases, or clauses which appeared to modify the entire sentence rather than any portion of it.

Diagrammatically, the analysis of the sentence was:



Each sentence was identified as to grade level, reader series, and page on which it occurred in the reader before the words of the sentence were allocated to the four parts of the ruled sheet.

The three sections of the sentence were further divided as follows:

1. Noun Phrase (the subject and all of its modifiers)

    determiner(s)
    single word modifier(s)
    head word of the noun phrase
    modifying phrase
    modifying clause

2. Verb Phrase

    A. The verb or verb phrase and its modifiers excluding the object or complement and its modifiers.

        tense - past/non-past
        modal
        have+en
        be+ing
        pre-verb modifier
        verb proper
        not/n't
        modifying clause
        modifying phrase
        one-word post-verb modifier(s) -- These

modifiers were entered under columns marked for different forms of adverbials:[4]

prepositional particle of verbs -- "down, up," etc.
adverbial pro-forms -- "There, here, now," etc.
noun -- "outside, downtown, today, a year, a mile," etc.
qualifier -- "somewhat, indeed," etc.
adjective + ly -- "bravely, silently," etc.

B. The Noun phrase (the object or complement and all of its modifiers).

determiner(s)
single word modifier(s)
head word of the noun phrase
modifying phrase
modifying clause

3. Sentence Modifier

Although the sentence modifiers were one-word, phrase, or clause modifiers, their relatively infrequent occurrence did not warrant separate spaces for each of them.

Immediately below this primary breakdown of a sentence, each clause in that sentence was analyzed by the same procedure.

Procedure for the Analysis of Sentence Sample

The sentences of the sample were analyzed in order of their frequency of occurrence of the connective beginning with the connective which appeared least in the study, "thus." Proceeding in

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[4]John C. Mellon, The Grammar of English Sentences, Unit Two: Real Sentences and Their Transforms (Culver: Indiana, 1964), pp. 169-180.

this order gave the low frequency connectives priority in the analysis of sentences in which there were two or more connectives. As these multi-connective sentences were only analyzed once, they were placed on the analysis sheet with the less common connectives. For example, the connective "because" with a relatively low frequency of occurrence of eighteen claimed the sentences in which it combined with "but," "and" and "who," all of which occurred more frequently. A more representative sample of sentences containing "because" resulted.

Upon beginning the analysis of the sentences of any one connective, those of a single occurrence were analyzed first followed by the sentences in which the connective occurred in combination with other connectives.

The Identification of Sentence Patterns

At the conclusion of the analysis a careful examination of the analysis sheets was made to attempt to identify sentence patterns which could be used as the basis for an item on the reading test. This proved to be an exacting and somewhat elusive effort. Patterns emerged in different ways. Very often the position of the clause was one of the first unique features of the sentence pattern to be revealed. In addition, the persistent use of particular structural features such as adverb phrases, determiners, tenses, negatives, an object or a complement, filled out a sentence pattern. As the

English language is so flexible, a wide variety of sentence patterns were found but when a pattern could be detected in about one-third or more of the total number of sentences containing that connective, that pattern was noted on the sheet and the number of the sentences which helped to bring it into existence were recorded.

In many instances clearly defined patterns did emerge and although no exacting and binding measure could be applied to their identification and formulation, the analysis of the sentences did enable test items to be chosen which were patterned after the sentences which children do read in the readers.

A careful check was kept of some of the transformations in each sentence so that typical constructions such as passives, questions, imperatives, the use of "it" and "there" etc., were not forgotten. The particular sentence analysis format used was suited to active voice assertion sentences and only by repeated reference to these accompanying transformation check lists, were the distinctive structures of these sentences preserved.

Sentences in which connectives occurred in frequencies of seventy-four or more were subject to analyses of a minimum of twenty sentences, selected randomly from each series and grade level for each of the single-connective and the multi-connective sentences. The patterns which emerged from these analyses were noted after which the remaining sentences in the sample were

analyzed without a written breakdown and the results tallied in with the patterns to which they appeared to coincide most closely. Appropriate changes were made in the sentence patterns as these sentences were categorized.

Particularly in the sentences which began with "but," "and" and "so," the sentences preceding them were also analyzed in an attempt to find sentence patterns which could be included in the test items using these connectives.

Before the sentence pattern had been decided upon, the frequency of occurrence of each connective was brought up to a total of ten examples each, for the connective used singly and for that in combination. This was accomplished by the reading of consecutive pages from the different readers for the identification of sentences using these connectives. For example, after the analysis of the "because" sentences was completed, there were seven sentences in which the connectives were used singly and nine sentences in combination with other selected connectives. By reading the pages of the readers which had not been used to extract the sample of sentences, other sentences were identified to bring the total in each of the two categories, single and multiple occurrence, to ten. These newly identified sentences were then analyzed and used to confirm or modify the sentence patterns chosen.

The only connective for which a full complement of ten in each of the two categories could not be found was the connective, "thus."

SUMMARY

In summary then, a total of 2,587 sentences was taken as the sample from the books used in grades four, five, and six in three selected reader series. From these sentences 36.99 per cent were found to contain two forms of connectives, one-word and phrasal connectives. The one-word connectives comprised 93.76 per cent of the sentences containing connectives and they alone were analyzed further. They were divided into two groups, those which connected ideas within a sentence and those which associated ideas from sentence to sentence. The former group contained two classes, subordinate and co-ordinate connectives with a special "absent" connective group included. The second of the two groups, sentence linkers, were few in number but were considered essential for the scope of the study, so a more complete investigation could be made. The distribution of individual connectives was tallied and a selection of seventeen connectives for further study was made. The sentences from the sample which contained these connectives were analyzed and sentence patterns were extracted for use in the test items of the reading test, the construction of which was the second phase of the study.

[illegible]

[illegible]

CHAPTER IV

THE CONSTRUCTION OF THE TEST

A reading test was constructed using the information from the analysis of the sentences containing the seventeen selected connectives. Each item of the multiple-choice test had four alternate answers. The first draft of the test used in the pilot study consisted of 199 test items set out in four comparable sections. The second and final draft distributed 150 test items equally among the three parts of the test (see Appendix A). This test will be referred to as the *Connectives Reading Test*. An alternate format for the fifty items of Part One of the test in which the connective was repeated as the first word of each alternate answer was administered a month after Part One, regular format, had been given, to see if this format change would significantly change the performance of the students. For the main study, a second test was added consisting of twenty test items in which the children supplied only the missing connective(s) to an otherwise complete test item (see Appendix B). The name of this test is the "*Written Connectives Test*."

This chapter will discuss the organization of the *Connectives Reading Test*, the construction of an individual test item, the pilot study, and the construction and use of an alternate format for the test. A short discussion of the purpose and compilation of the *Written Connectives Test* will follow.

I. THE ORGANIZATION OF THE CONNECTIVES READING TEST

A multiple-choice type of test was selected because it has been used frequently in many standardized reading tests with good results. The format of these test items with their alternate answer choices gave an opportunity also to investigate the nature of the students' errors as well as their ability to select the correct answer.

The final draft of the reading test consisted of 150 multiple-choice items, a total of eighty-five single connective items and sixty-five multi-connective items (Table XIII). With the exception of the connective "thus" and "that" (simple includer) each connective was tested a minimum of eight times, at least four times singly and three times in combination. The number of times each one of the seventeen connectives was tested in items designed for it, was kept as even as possible.

When a test item was constructed the blank which followed a particular connective indicated the testing of the student's comprehension of that connective. In a number of test items other connectives appeared in the sentence but no answer blank was left after them because the item was testing one of the other connectives. The number of additional test items in which a connective appeared but which were designed to test another of the selected connectives, is given in column four of Table XIII.

TABLE XIII

THE DISTRIBUTION OF CONNECTIVES IN TEST ITEMS

Connectives (by class)	Number of Items in Test* (1)	Number of Single Connective Items* (2)	Number of Multi-Connective Items* (3)	Number of Additional Items in which Connective Appears (4)
although	10	4	6	0
because	10	5	5	0
if	9	4	5	5
so	9	5	4	0
that (simple includer)	5	2	3	19
when	9	5	4	1
where	11	8	3	1
that (relative pronoun)	12	8	4	4
which	8	4	4	3
who	8	5	3	7
"absent"	9	7	2	8
and	9	6	3	8
but	10	6	4	7
for	9	5	4	2
yet	8	4	4	0
however	8	4	4	0
thus	6	3	3	0
Totals	150	85	65	

*These are the test items which have been designed especially to test the connective. The number of other items in which the connective appears is given in column four.

A comparison with Table X on pages 86 and 87 will show that the connectives are being used in test items in close approximation to their frequency of occurrence in the sentences of the reader series with the possible exception of "that" (simple includer). This latter includer appears to be a most adaptable connective and the sentences in which it functioned yielded more consistent sentence patterns than other connectives. Therefore, more sentence patterns which included it were selected for test items.

Table XIV gives the details of the combinations of the seventeen connectives in the sixty-five items. Connectives join ideas using connectives from their own class or those from other classes in an endless variety of combinations. In each combination the connective across from which it is listed in Table XIV is the connective for which the test item was designed. For example, the "although"-where" combination is listed with "although" so the test item would have an answer blank after the connective "although" not after "where." The item is designed to test the pupil's understanding of "although."

There was an overall pattern for the selection of the test items for each connective, a flexible guide. This pattern consisted of:

A. A minimum of two items in indirect discourse using the connective singly.

B. A minimum of two items in direct discourse using the connective singly also.

TABLE XIV

CONNECTIVE COMBINATIONS USED IN TEST ITEMS

Connectives	Combinations*	Frequency
although	- although - where	1
	- although - who	1
	- although - that (simple includer)	3
	- that (simple includer) - although	1
because	- but - because	2
	- who - because	1
	- that (simple includer) - and - because	2
if	- if - "absent"	2
	- and, if	1
	- if - which	1
	- but - if	1
so	- so - "absent"	2
	- but - so	2
that (simple includer)	- and - that (simple includer)	1
	- "absent" - that (simple includer)	2
when	- when - and	1
	- when - that (simple includer)	2
	- that (simple includer) - when	1
where	- who - where	1
	- that (simple includer) - where	2
"absent"	- "absent" - that (relative pronoun)	1
	- "absent" - "absent"	1
that (relative pronoun)	- that (simple includer - that (relative pronoun)	2
	- that (relative pronoun) - if	1
	- that (relative pronoun) - that (relative pronoun)	1

* Connectives are listed in the order of their appearance in the test item.

TABLE XIV (continued)

Connectives	Combinations	Frequency
which	- but - which	2
	- and - which	1
	- that (simple includer) - which	1
who	- who - that (relative pronoun)	2
	- that (simple includer) - who	1
and	- and - who	1
	- and - "absent"	1
	- and - "absent" - if	1
but	- but - and	1
	- but - when	1
	- but - that (simple includer)	1
	- but, if	1
for	- for - if	1
	- for - and	1
	- for - which	2
yet	- yet - and	1
	- yet - that (simple includer) who	1
	- yet - that (simple includer)	2
however	- however - that (relative pronoun)	1
	- however, for	2
	- if - however	1
thus	- thus - who	3

17 connectives were used in combination in a total of 65 items

C. A minimum of two items using the connective in combination with another connective.

D. A number of single items chosen because they contained some desirable feature for investigation such as the passive voice, an "it" construction, an imperative format, etc.

In the pilot study the groupings, A - C above, all contained three test items each but these were reduced to two usually, for the main study. Rigidity of format was not countenanced as the test items had to be built upon the results of the sentence analysis to retain their construct validity.

The 150 test items were assembled in groups according to each connective being investigated and then were randomized using a table of random numbers. At the conclusion of each set of fifty test items, a new section of the test was begun for convenience of administration.

The reading test was untimed and the students were allowed to work until all had finished or until almost all of the class members had completed the test. Test instructions followed those of the STEP tests exactly, as the battery of STEP Reading, Writing, and Listening Tests were also given in the main study and the use of uniform instructions cut down the possibility of misunderstandings and variations in test administration considerably.

II. THE CONSTRUCTION OF ONE TEST ITEM

In this section the procedure followed in the construction of a test item, the vocabulary control imposed, and the choice of the distractors will be discussed.

Procedure

The construction of any one test item followed a set procedure. The choice of a sentence pattern was determined by the analysis of the sentences in the reader series and in many cases one of the sentences from a reader was extracted in its entirety from the reader and only the vocabulary was adjusted. The sentence chosen was then written down, up to and including the connective being tested. (Test Item #2, is the one exception). The rest of the clause which this connective introduced was written below the sentence as the alternative answer (a). A space of uniform length was left in the sentence for the insertion of the answer by the student and then any remaining portion of the sentence was written down. For some connectives, especially those which appeared as the first word in the sentence, the sentence preceding was also recorded to show how the connective was functioning. This alternative answer (a), the correct answer, would reveal that the student had a good understanding of the connective and that there was a smooth connection of meaning from the clause to the rest of the sentence.

The task of constructing the other three alternative answers (b), (c), and (d) was then undertaken. Each one of these answers was to be wrong and each was to contain a different type of error. The second alternative answer (b) used the connective correctly giving the same smooth transition of meaning to the sentence as the correct answer but it incorporated a grammatical error of some type. Sometimes it was an error in verb form, a mistake in agreement between subject and verb or perhaps, the incorrect use of a pronoun. The third alternative answer (c) also endeavored to use the connective correctly but the situation expressed in that part of the clause following the connective, was to be wrong. This proved to be the most difficult task of item construction as so many situations are possible especially to the alert student while situations so far removed from reality that they bordered on the ludicrous, made the student wary. The fourth and last alternative to the test item (d), was predicated on the use of an entirely different connective than the one being tested in the item.

A conscious attempt was made to keep the alternative answers of (b), (c), and (d) as close as possible to the language structure of the correct answer (a). The summary table below, Table XV, shows the design of an individual test item.

TABLE XV

THE STRUCTURE OF AN INDIVIDUAL TEST ITEM

Answers Given in One Test Item	Connective Fits the Meaning of the Sentence	Answer is Grammatical	Answer Makes Sense in Context
(a) correct answer	yes	yes	yes
(b) incorrect answer	yes	no	yes
(c) incorrect answer	yes	yes	no
(d) incorrect answer	no	yes	may or may not

The answers to the test items were then randomized using a table of random numbers.

Vocabulary Control

A vocabulary control was imposed upon the words used in the test items. Only the first 5,000 words from the Thorndike and Lorge list[1] were used placing the grade level of difficulty at approximately midpoint in grade five. Any word in the first column of the list, the summary column, which had a word count from fourteen to AA inclusive was regarded as an acceptable choice. In the spring of the year when the main study was conducted most of the students in grade five should have been able to read well, all the words in the test

[1]Edward L. Thorndike and Irving Lorge, The Teacher's Work Book of 30,000 Words (New York: Bureau of Publications, Teachers College, Columbia University, 1959).

items. Many students in grade four also would be able to read each word without difficulty but there would be some who would have trouble. Only the poorest of the grade six students would not know the words in the items.

The Thorndike and Lorge word list was selected because it was based upon a count of the words in the reading material to which students are exposed. Other lists including those of Rinsland, and Buckingham and Dolch[2] are based upon the writings of the children themselves. As the children are often asked to read what someone else has written for them, it was considered more appropriate for this study to choose a list which had been compiled from such writings.

Various limitations were found in the list. The original edition of the list was published in 1944 and although it underwent its third printing in 1959, no further revision appears to have been made. More than two decades have passed since its compilation and whole categories of terminology such as those in the fields of television and space travel could not be used in the test items because they were not included in the list. One of the reasons for the use of the Winston Basic Readers in the sentence analysis was to give opportunity for the inclusion of subject

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[2]Henry D. Rinsland, "A Basic Vocabulary of Elementary School Children (New York: The Macmillan Company, 1950), p. 5: and B. R. Buckingham and E. W. Dolch, A Combined Word List (New York: Ginn and Company, 1936), p. 4.

matter from the fields of science, social studies, and mathematics. Because so few of the words from these selections were contained in the list used, this type of subject matter content was ruled out. It was apparent too, that the control of the words in this list is a surface control only. Two words used separately and both within the limits of the vocabulary control set, have quite a different meaning when they are used together. For example, both the words "rip" and "cord" are in the list but the meaning of "rip cord" is different and perhaps more difficult than the meanings assigned to them as isolated words. Using this list gave little control over the difficulty of the concepts which were written into the test items. All of the students would understand the use of "head" as a body part but some would not understand its use in the sentence, "They headed for the mine."

Choice of Distractors

From the three wrong alternate answers of each test item, one was chosen as the distractor for that item. A good distractor to be legitimate must be considered as an adequate solution to the item by some members of the group to be tested.[3] Immediately after the construction of the test items, the first selection of which

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[3]Robert M. W. Travers, Educational Measurement (New York: The Macmillan Company, 1955), p. 185.

alternative wrong answer could be the distractor, was made. After the pilot study this selection was reviewed to ensure that the distractor represented a greater percentage of the lower achievers. The item analysis computer program divided the students into fifths according to their achievement on the test and the performance of each of the groups was set out for the 150 test items separately. Therefore, it was possible to identify the number who chose each alternate answer from each of the achievement groups.

III. THE PILOT STUDY

A pilot study for the assessment of the reliability and validity of the test scores on the reading test constructed was carried out in Edmonton, Alberta. The 199 test items were given to 112 children in grades four, five, and six in two testing sessions in December, 1964. A repeat testing session was conducted two weeks later. Due to inclement weather during this period, only eighty children were present for all four testing sessions.

The heterogeneous school population determined the choice of the school. The children in this area come from a wide variety of socio-economic backgrounds and their mental maturity scores secured from the school records, ranged from eighty-three to one hundred forty-five.

In the testing sessions each classroom of children were given instructions by the investigator paralleling the preliminary instructions on the STEP tests. The children completed one-half of the reading test (approximately 100 test items) in two sittings with an intermission of at least fifteen minutes between them.

Test Reliability

To determine the reliability of the test, the Kuder-Richardson formula 20 was used to compute reliability coefficients. This correlation of the test with itself by virtue of the positive intercorrelations of the items composing it, is an estimate of the percentage of the total variance that may be described as true variance, i.e., not due to error.[4] The Kuder-Richardson formula 20 as such a measure of internal consistency stresses the intercorrelations of the items in the test and the correlations of the items with the test as a whole.[5] Table XVI gives the reliability coefficients of both the pre-test and the post-test, indicating that the test items do have high intercorrelations with each other and that they are measures of the attribute being tested, pupil understanding of connectives in reading.

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[4] G. F. Kuder and M. W. Richardson, "The Theory of the Estimation of Test Reliability," Psychometrika, Vol. 2, No. 3, September, 1937, pp. 151, 159.

[5] George A. Ferguson, Statistical Analysis in Psychology and Education (Toronto: McGraw-Hill Book Company, Inc., 1959), p. 281; and Henry E. Garrett, Statistics in Psychology and Education (Toronto: Longmans, Green and Co., 1958), pp. 340 - 341.

TABLE XVI

TEST RESULTS FROM PRE-TEST AND POST-TEST OF THE PILOT STUDY

Test	No. of Items in Test	Kuder-Richardson Reliability Coefficient (formula 20)	Test Mean	Test Variance	Standard Deviation	Range of Scores of 80 Students in Fifths (each group - 16 students each approximately)		
						Group	Range of Scores	Range in Marks
Pre-test	199	0.9843	129.15	1450.73	38.06	upper 5	185-165	20
						upper 4	164-146	18
						upper 3	145-125	20
						upper 2	124-89	35
						upper 1	88-55	33
Post-test	199	0.9906	135.55	1812.87	42.58	upper 5	189-170	19
						upper 4	169-161	8
						upper 3	160-137	23
						upper 2	136-86	50
						upper 1	85-47	38

[illegible]

In both tests the variance was large confirming the heterogeneity of the student group and although the test mean was higher in the post-test, the variance too, was greater to compensate.

The range of scores indicates how the scores were spread from fifth to fifth of the students. The upper fifth represents the sixteen students who scored the highest on the test. In the post-test there was a concentration of student scores in the second group or fifth with only an eight mark spread among them. The wider range of the two lower fifths of students in the post-test is also noted. Memory and practice effects could account for the higher achievement of the better students while the reverse effect together with a greater degree of frustration could account for the poor performance of the less able students.

It is noted that in neither test did any student approach a perfect mark and there were some students who could answer only one-quarter of the items correctly.

Test Validity

At this point in the pilot study the only validity that could be claimed was the content validity of the test items. As the items had been constructed from the actual sentences used in the readers there appears to be no question of content validity. In the analysis of the test results from the main study, an attempt will be made to show the validity of this test by a comparison with the results of the

standardized STEP Reading Test. The test was long and lengthening a test does increase validity as well as reliability so the test should be more valid than a shorter one would have been.[6]

Item Analysis

Three aspects of the item analysis will be discussed: item selection, item difficulty, and item validity. As the individual items were based on the sentences read by the children in the reader series, content validity for the items individually is claimed.

The item analysis program from the Department of Computing Science, University of Alberta, yielded a difficulty index for each item on the test. These indexes were carefully noted according to the classification of the connective class which the item represented so that the best possible selection of items could be made in the reduction of the 199 test items of the pilot study to the 150 items for the main study. Garrett[7] suggests that the normal curve can be used as a guide in the selection of the items from the difficulty indexes. However, the main concern of the investigator was to retain the greatest possible number of discriminations among the scores of individuals, so it was decided to retain as many items as possible which were close to a difficulty index of .500. This index representing five passes and five failures on an item gives a maximum of

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[6]Garrett, op. cit., p. 356.

[7]Garrett, op. cit., p. 364.

twenty-five possible variations in scores for every ten students. As seen in Table XVII, ninety-eight of the 199 items in the pre-test had difficulty indexes from .400 to .600, representing 49.25 per cent of the test items. Those which have a difficulty index above .750 represent close to 25 per cent of the items, the recommended percentage if the normal curve was the guide. The highest index was 0.950 and the lowest was 0.200. The absence of test items with indexes less than 0.200 may be partially accounted for by the strict vocabulary control set at mid-point in grade five which made the items easier for grade six students especially. However, 71.36 per cent of the test items (142 items out of the 199 items) are not considered too hard or too easy. The absence of very hard items (those with difficulty indexes less than 0.200) was not remedied in the interests of keeping poorer readers working at the test, and in securing a greater variation of student performance on the test.

TABLE XVII

DISTRIBUTION OF TEST ITEMS ACCORDING TO DIFFICULTY INDEXES

	Number of Difficulty Indexes From:						
	0.00 to 0.199	0.200 to 0.399	0.400 to 0.499	0.500 to 0.599	0.600 to 0.699	0.700 to 0.799	0.750 to 0.999
Pre-test	nil	15	17	43	38	29	57
Post-test	nil	10	10	27	48	37	67

The validity index of each test item was secured through the biserial coefficients of correlation, which gives the correlation of an item with the total score on the test. Although a general rule indicated that items with validity indexes of 0.200 were regarded as satisfactory,[8] the decision was made to drop all items with biserial correlations of less than 0.300 unless such items were isolated examples of some area of investigation such as the use of the passive construction. If the item could not be dropped without a disturbance in the overall pattern for the test, an effort was made to isolate the difficulty and reclaim the item. There were twenty-three items in the pre-test and nine items in the post-test with correlations lower than 0.300.

The practice and memory effects were evident in the post-test as there was a small but consistent shift to a higher difficulty index for some items. However, 66.33 per cent of the items are still not considered too easy or too hard, a slight drop of about 5 per cent from the pre-test figures.

To reduce the items to the required 150 from the 199 items in the pilot study, the pre-test figures were used as the main basis of judgment. As many items as possible which hovered about a difficulty index of 0.500 and which had the highest possible biserial correlation were retained for the final draft of the test.

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[8]*Ibid.*, p. 368.

Some items were reworked and their retention was substantiated as no items fell below 0.200 in the main testing (biserial correlation) and only six items had correlation coefficients between 0.200 and 0.299. Careful check was made also by connective groupings (that is, all the items designed for a particular connective) and an additional study was made of each item to ensure that the students who were achieving higher scores were not being penalized because they saw more possibilities in the alternate answers than the other students.

IV. THE CONSTRUCTION AND USE OF AN ALTERNATE FORMAT FOR TEST ITEMS OF PART ONE OF THE <u>CONNECTIVES READING TEST</u>

In discussion that followed the appraisal of the pilot study the question was raised whether or not the students had found the test as difficult as they did because the particular connective being tested was retained in the main body of the sentence, separated from the alternate answers. To find the answer to this question, an alternate format for Part One of the test was constructed placing the connective at the beginning of each alternate answer of each test item. An example is given below:

<u>Part One, Regular Format</u>:

"Did you finish your spelling?" said the teacher to the little boys who ....

a. because they put their pencils down on their desks

b. sisters were teasing them about their spelling

c. were writing some words on their papers

d. were racing down the hill on the wagons

<u>Part One</u>, <u>Alternate Format</u>:

"Did you finish your spelling?" said the teacher to the little boys ....

a. who because they put their pencils down on their desks

b. who sisters were teasing them about their spelling

c. who were writing some words on their papers

d. who were racing down the hill on the wagons

It was hypothesized that there is no significant difference between the scores of the students on Part One, regular format of the test and Part One, alternate format.

The alternate format section of the reading test was administered three to four weeks after the regular testing session had concluded, to ninety-two children representative of the rural and small town populations. The Easter holidays of ten days was included in this interval of time.

The test item answers were programmed together with all of the test scores and an item analysis was run. Table XVIII shows the comparison between the two formats of Part One. A "t" ratio was computed to determine the difference between the two means for

the correlated samples.[9] With a value of "t" = 1, for a two-tailed test at the .001 level, there is no significant difference and the null hypothesis was upheld. This comparison was conclusive and no further consideration was given to testing with the alternate format.

TABLE XVIII

COMPARISON OF PART ONE, REGULAR FORMAT AND PART ONE, ALTERNATE FORMAT

Test	Test Mean	Number of Students	Standard Deviation	Degrees of Freedom
Part One, Regular Format	32.80	92	9.69	91
Part One, Alternate Format	30.02	92	11.88	91
			t = 1.	(ns)
			p $\angle$ .001	

V. THE WRITTEN CONNECTIVES TEST

A short test of twenty items in which the students were asked to complete sentences by filling in the blanks with one word was administered to each child who took the reading test (see Appendix B). The sentences in the first eighteen test items were taken from those

[9]Ferguson, *op. cit.*, pp. 138-140.

which had not been needed for the main study but which had been shown to be both reliable and valid in the pilot study. Each item consisted of a sentence in which a blank was left where the connective should have been. The children were instructed to select one word which they felt would best fill the space. The last two sentences are part of the Minkus Completion Test in the Revised Stanford-Binet Intelligence Test, 1937 Edition.

Fourteen of the items had one blank space; six items contained two separate spaces in the sentence and one item had three blank spaces, each separated from the other.

This portion of the test was administered to assess the ability of the children to join ideas together acceptably with their own choice of connectives. Encoding in addition to decoding of their thoughts was necessary, thereby extending the bounds of the study set for Parts One to Three. The answers to these test items as given in the reader series included the use of each of the seventeen connectives with the exception of "however." There was opportunity for the use of this latter connective though if the student so wished, as a variety of words could usually fill any space acceptably.

After the test items had been collected, they were randomized by the use of a table of random numbers and typed with a space of uniform length for the insertion of the one-word answer.

SUMMARY

Two tests then were constructed to appraise pupil understanding of connectives in reading. The *Connectives Reading Test* was comprised of 150 multiple-choice items which used seventeen selected one-word connectives singly and in combination. The *Written Connectives Test* gave the pupil the opportunity to insert his choice of a word in the blanks of twenty test items.

The pilot study established the reliability of the test, and the investigation with an alternate form for Part One of the *Connectives Reading Test* showed that writing the connective being tested as the first word of each of the four alternate answers did not significantly change the performance of the children on this part of the test.

CHAPTER V

THE EXPERIMENTAL DESIGN

A description of the experimental design and an account of the conduct of the experiment is the subject of this chapter. Divided into five sections the chapter will describe this design, the students who participated in the experiment, the data pertinent to the study, the procedure used in collecting the data, and the treatment of it.

I. EXPERIMENTAL DESIGN OF THE STUDY

The research design used in this study is a treatment by subjects plan. The treatment is the Connectives Reading Test prepared especially to appraise the pupils' understanding of connectives in reading. The details of the construction of this test given in Chapter IV, described how the test items were structured to allow for the investigation of a number of areas of interest which have been expressed both in the null hypotheses and in less formal statements. The subjects who completed this test were children aged eight to twelve who were studying in Alberta schools in grades four to six.

As research studies have revealed that certain variables should be statistically controlled for more reliable experiment results, seven were controlled in this investigation: sex, chronological age, mental ability, socio-economic status, and achievement in listening, reading, and written language.

The data collected from the Connectives Reading Test and from the control of the variables, were analyzed by a variety of statistical techniques; item analysis, the computation of correlations, analyses of variance and covariance, and factor analysis.

II. THE SAMPLE

In order to have the sample representative of the school population of Alberta within age and grade levels set out for the problem in the study, a stratified randomized sampling procedure was modified to obtain a test population from which the actual test sample was later drawn. This section will describe the test sample in terms of the pupil population in Alberta that it represented, the socio-economic status of our Canadian society, and the grade, age, and sex of the children.

Pupil Population in Alberta

The closer the test sample represented the student population in Alberta, the wider the application the study results can have as research studies have indicated that children from the various population strata may have their own strengths and weaknesses in the language arts. Therefore, a sample of students was drawn which was proportionate to the population strata of the province.

The term "population strata" will refer in this study to students grouped according to place of residence, city, small town,

and rural areas. Stratum by job or occupation will be referred to as "socio-economic status."

Reports from the school divisions and counties did not give access to school enrolment figures by places of student residence so a proportionate breakdown according to the total provincial population was procured.

The three places of residence, were defined as follows for this study. A city is a community of people numbering 19,000 or more people; a small town, a community of 1,000 to 19,000 people; and a rural area is a community of less than 1,000 people. Many of those included in the small town population in this study would be counted as urban dwellers according to the official census.[1] However, the gap between the reading facilities a city of 1,000 people and one of 281,000 would offer, seemed too large for their mutual inclusion in one category here.

Using the figures of the latest census as the basis for calculation,[2] and working within the definitions stated above, 51.40 per cent of the people in Alberta are urban dwellers, 11.89 per cent are small town residents, and 36.71 per cent live in rural areas. The provincial government reports[3] showed that in

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[1]Queen's Printer, Canada 1963. The Official Handbook of Present Conditions and Recent Progress (Ottawa: Dominion Bureau of Statistics, 1963), p. 10.

[2]Ibid.

[3]Figures obtained from the Department of Education, Province of Alberta, September, 1964.

October, 1962, the children in grades four, five and six, aged eight to twelve inclusive, numbered 86,432 out of a total school population of 322,222. The number of children living in the city, small town, and rural areas was then considered to be in direct proportion to the distribution of the total population in these three strata.

A test sample of 500 students drawn proportionately from these three population strata was considered adequate as this number would cover a range of $\pm$ 3.19 from the mean in a normally distributed population,[4] approximately 99.86 per cent of the cases in the sample.

Socio-Economic Status of the Pupil Population

A known variable in a language arts investigation is the education of the parents and the income they have. Children whose parents have a good education are often encouraged to read more than other children. Homes, too, which have sufficient income to provide good reading material may provide opportunities for children to develop and extend their reading skills. For these reasons it was necessary to assess the socio-economic status of each of the students using the Occupational Class Scale by Blishen.[5]

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[4]Garrett, Henry E., Statistics in Psychology and Education (Toronto: Longmans, Green and Co., 1958), p. 208.

[5]Bernard Blishen et al., Canadian Society: Sociological Perspectives (Toronto: The Macmillan Company of Canada, Ltd., 1961), pp. 477-484.

From the data of the decennial census of 1951, Blishen arranged the occupations reported in this census according to the income which members of this occupational group received and according to the years of schooling they had had. The average of each, income and years of schooling, was taken and the standard scores of these two measures was computed after which each occupation was ranked according to its combined standard scores. There were 343 occupations listed and these were separated into seven classes with the female and male categories of many of the occupations kept separate.

The class divisions were set arbitrarily and the author acknowledged that he had made no attempt to keep class intervals equal in size because to have done so would have necessitated combining jobs which in his opinion were those of fairly low prestige with those of high prestige.

Blishen computed rank correlations with the only other available Canadian Scale[6] and between the ratings of occupational prestige in the United States, Great Britain, Germany, Japan, and New Zealand.[7] The rank correlations were high in all cases indicating to him that his occupational scale reflected the same variables underlying the prestige scales of the other countries, and that of Tuckman in Canada.

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[6] Jacob Tuckman, "Social Status of Occupations in Canada," Canadian Journal of Psychology, Vol. 1-2, 1947-48, pp. 71-74.

[7] Blishen, *op. cit.*, p. 479.

In the Scale, then, each occupation was entered in one of the seven classes and a standard score was given to it, calculated separately for each sex.

During the testing session for this study in a school, the father's occupation was recorded from the school register by the classroom teacher. The occupation of the mother was recorded also but was used only in cases where she was the main support of the family. Each child was assigned a socio-economic score on the Occupational Class Scale.

A number of inadequacies were noted in the use of the Scale. Farmers were considered on the Scale as a homogeneous economic group which they are not. A similar problem existed in assigning scores for men of a certain trade who also owned their own businesses and employed others to help them. These men could be assigned two scores, that of a plumber, for example, and also of a retail trade manager or foreman. Often these two socio-economic scores were in two separate occupational classes as well. Perhaps the degree of responsibility assumed by the person in his occupation should be considered in the calculations of scores. A number of wage earners hold two jobs such as farmer and oil worker, with scores and classes of each capable of varying a great deal. The oil industry in Alberta precipitated a special problem in that particular jobs within the industry have evolved since the compilation of the Scale and the degrees of specialization in it were not

accounted for. This made it difficult to rank oil workers as the children were not always able to describe their fathers' jobs in sufficient detail.

A revised edition of Blishen's book in 1964 made no changes in the Occupational Class Scale even though the census of 1961 has since been completed.[8]

Age Range of Pupils in the Test Sample

The age range of the children, in addition to their grade levels, was stated in the problem of the study in order to include only those children in the sample who were within the scope of the study. To reflect the numerous streaming systems in operation in the province, the age limit was lowered to eight years to admit a representation from the 7,285 students[9] who are advancing through the grades ahead of the average students. In contrast, to avoid including students who were in special schools such as schools for the mentally retarded or special schools where physical handicaps necessitate a slower academic pace, the upper age limit was confined to those who had not yet reached their thirteenth birthday.

The record of the pupils' ages was taken from the classroom register.

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[8]Blishen, op. cit., pp. 449-458.

[9]Figures obtained from the Department of Education, Province of Alberta, September, 1964.

Grade Levels of the Pupils in the Test Sample

Grades four to six were chosen because in Alberta they represent the levels at which the students build upon their word recognition background in reading to quickly develop many reading skills associated with the various subject area fields such as mathematics, social studies, and science. Also, at each one of these grade levels, reading is still given at least one hour instruction time each school day. The opportunity, therefore, to investigate the comprehension of children at the grade levels at which children both read widely and spend an appreciable amount of instruction time, is possible in these selected grades, four to six.

Sex of Pupils in the Test Sample

The official figures[10] revealed that the numbers of boys and girls in Alberta schools at these grade levels are almost equal. Therefore, the sample drawn for the test included equal numbers of boys and girls.

Final Test Sample

At the conclusion of the testing session all students who had been absent for one or more tests were dropped from the test sample. One student whose family was on welfare was taken out as

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[10] Ibid.

no socio-economic rating could be secured for him. The remaining students were then balanced in the sample by grade, sex, and population strata with adjustments made so the best possible proportionate representation of the socio-economic classes according to the Occupational Class Scale could be retained. Any deletions after these considerations had been taken into account, were random. After all necessary deletions had been made from the 500 students who were tested, 402 students remained in the sample. Table XIX analyzes this sample according to grade, sex, and population strata.

TABLE XIX

THE TEST SAMPLE (N=402)

Population Stratum	Grade Four		Grade Five		Grade Six		Total
	Boys	Girls	Boys	Girls	Boys	Girls	
Urban	34	34	34	34	34	34	204
Small Town	8	8	8	8	8	8	48
Rural	25	25	25	25	25	25	150
Totals	67	67	67	67	67	67	402

III. DATA PERTINENT TO THE STUDY

Data from the Main Testing Instrument

In order to secure data specifically about the comprehension of the students for connectives, the Connectives Reading Test was constructed as described in Chapter IV, and administered to the children participating in the investigation.

Data from the Tests Controlling Certain Variables

Mental Ability. Children who are brighter often have a facility and understanding of their language which less bright children do not have. It was necessary, therefore, to assess the mental ability of children taking the tests, and the Cooperative School and College Ability Test, Level 5, Form 5A, was administered. This test, commonly called SCAT, is described by Buros[11] as one in which four operational skills are measured. The combined scores from Part I, getting the meaning of isolated sentences, and Part 3, associating the meanings of isolated words, give a verbal score. Part 2, which asks students to perform numerical computations rapidly and Part 4, to solve arithmetic problems, combine their scores in a total quantitative score. The verbal and quantitative scores give

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[11]Frederick B. Davis in The Fifth Mental Measurements Yearbook, ed. O. K. Buros (Highland Press, New Jersey: The Gryphon Press), p. 451.

a total test score which is intended to estimate the capacity of students to undertake additional schooling. Fowler[12] reviewed the validity, reliability, and standardization of the test and concluded that SCAT is a superior test in which there is room for improvement. He emphasized that SCAT-STEP should be a useful team.

STEP, the abbreviated name for the Sequential Tests of Educational Progress, a series of tests which indicates students' achievement, is the companion to SCAT which indicates students' ability to achieve. Seven tests are available in the series of which the reading, writing, and listening tests were used in this study. Jackson[13] felt that in many respects the tests are of superior quality as the series makes possible the review of a student's progress of skills and understanding from one grade level to another. He added that test items were on the whole well constructed and that the publishers merited praise for their attempt to measure the student's ability to apply his learning in problems of practical consequence. Although he concluded that from a technical point of view, the STEP series was undoubtedly one of the best available, he warned that more complete information on both reliability and validity is needed.

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[12] Hanford M. Fowler in Buros, op. cit., pp. 453-455.

[13] Robert W. B. Jackson, in Buros, op. cit., pp. 62-67.

Listening Achievement. A child learns to listen before he learns to speak, and after that he learns to read and write. The child's achievement in listening affects his achievement in reading. To control this situation Level 4, Form 4A of the STEP Listening Test was administered in the study. A series of thirteen selections of different types such as directions, simple explanation, narration, and argument, etc., are read in turn to the student after each of which he answers multiple-choice test items based on the selection read. Lindquist[14] was not sure how seriously the variables associated with the oral reading of passages by the local examiner would affect test performances. Although he concluded that within the limitation of any listening test constructed according to the same general formula, this test was well done, he regretted the inadequate norms provided and the lack of provision of comparable scales for various tests in the battery.

Reading Achievement. Level 4, Form 4A of the STEP Reading Test was given to the children so that their general achievement would be known. Their reading comprehension in general could then be compared to their reading comprehension of connectives in particular.

This is a reading comprehension test of seventy multiple-choice items constructed to assess the abilities to: reproduce ideas,

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[14]E. F. Lindquist, in Buros, op. cit., pp. 652-664.

translate ideas and make inferences, analyze motivation and presentation, and to criticize. No separate scores are presented for each of these functions. A single score of the number right is the one total score obtained.

A number of passages of various types are read by the student after each one of which he is asked to answer the test items pertaining to that passage. The types of passages included directions, announcements, letters, poetry, essays, and speeches.

Wiseman[15] concluded that the reading test was useful and efficient but he felt that factor analysis data or other evidence on construct validity and reliability data in addition to calculations based on Kuder-Richardson formula 20, should be given as well.

Written Language Achievement. The written language ability of children is interrelated, too, with their reading ability, and as the Written Connectives Test required students not only to read but to write, the STEP Writing Test, Level 4, Form 4A, was given to students in the study.

In a review of the test, Zahner[16] protested that it was not a test in writing but rather something between a test of proofreading and one of editing. Nowhere in the test is the student

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[15] Stephen Wiseman, in Buros, op. cit., pp. 752-754.

[16] Louis C. Zahner, in Buros, op. cit., pp. 362-363.

asked to do any writing. He conceded that within the limits set, this objective test about the skills of written composition, is a strong one, well conceived, and well executed, even though it did leave open the question of whether or not the student could apply these skills in practice.

A great deal of reading is required of the student in this written language test. One by one he reads a number of passages of varying types such as formal and informal letters, minutes of meetings, stories, etc., and then answers multiple choice items based on the passage, the same procedure as in the STEP Reading Test.

The manual indicates that the sixty items of the test are appraising student achievement in five categories of written language: organization, the ordering of facts; conventions, the identification of errors of word choice, punctuation, and spelling; critical thinking; effectiveness, exactness of expression, adequacy of emphasis, etc.; and appropriateness, the choice of a suitable level of usage according to purpose and reader.

The investigator was aware of all these test inadequacies before the administration of the tests but no other battery of tests appeared to be free from the majority of these same criticisms by reviewers.

IV. COLLECTION OF THE DATA

As the greater proportion of the population of Alberta is concentrated in the north central area of the province from Red Deer north, the city of Red Deer was an appropriate selection for the urban test population. The choice of three elementary schools in Red Deer city was made by the school officials to facilitate test administration through easy access, and the pupils in these schools were considered by them to be representative of the school population in that city. Similarly, the choice of Leduc for the small town testing population and the rural area of Calmar were considered by the elementary school supervisor in Leduc County to be representative of children attending school there.

The collection of the data extended over the period from March 3 to March 23rd, 1965. Testing in Red Deer city was done the first week of March; in the town of Leduc, in the middle of the month; and in Calmar near the end of the month.

In each classroom the children were given their test instructions by either the investigator, the school principal, or the elementary education supervisor. This personnel also gave the _STEP Listening Test_ to standardize the variable of the oral reading of passages by local examiners. The teachers supervised their own classrooms during the writing of the tests.

V. TREATMENT OF THE DATA

The children's answers to all the tests except the *Written Connectives Test* were scored by the IBM Optical Mark Reader while test papers for the latter were hand scored.

All statistical procedures were programmed for use on the IBM 7040 by the Division of Educational Research Services, Faculty of Education, University of Alberta, Edmonton.

Item Analysis

Two item analyses were carried out in the study, one for the Pilot Study and one for the main investigation. The second analysis included four separate item analyses, one for the entire test sample of 402 students, and the other three for each of grades four, five, and six student groups. The four analyses permitted investigations of the children's performance across the three grade levels and within the individual grades.

Item Analysis in the Pilot Study. The main objective of this item analysis as described in Chapter IV, Section III, was to establish the reliability and validity of the *Connectives Reading Test*.

Item Analysis in the Main Investigation. In addition to a counter check on the reliability and validity of the *Connectives Reading Test*, a series of analyses of connectives were made to gain the following information:

1. Achievement of the Students. For the total student group in grades four to six, and for the groups in each of grades four, five, and six, the percentage of correct answers and errors were calculated for:

A. The total test, the 150 test items.

B. The groups of test items which represented each class of connectives, with the percentages given separately for both single connective and multi-connective test items.

C. The groups of test items which represented each of the seventeen connectives, single and multi-connective test items calculated separately.

Each of the item analyses divided the students into five achievement groups by total scores on the Connectives Reading Test making possible the extension of the analyses above to these achievement groups.

2. Student Membership of Each Achievement Group. The students who were in the five reading achievement groups of the Connectives Reading Test were described by their chronological and mental ages, the socio-economic status of their parents, and their performance on the STEP tests.

3. Order of Difficulty of Test Items in Each Grade. The test items were rearranged according to their difficulty indexes so a comparison of the twenty hardest items from one grade to another could be made.

Computation of Correlations

Intercorrelations of Connective Reading Test Scores. To show the relationships among the test scores of each of the seventeen connectives and with the total test scores, correlations were computed by grade and sex and their significance determined using "t" tests.

Correlation of the Connectives Reading Test Scores with Selected Variables. Working with the total test group (N=402) correlations were determined between the total test scores on the Connectives Reading Test and the following: the STEP tests in reading, writing, and listening, the SCAT test, grade, sex, socio-economic status, and the seventeen connective subtest scores (Connectives Reading Test).

Stepwise Multiple Regression Analysis. This analysis indicated how well seven chosen covariants would predict the total score on the Connectives Reading Test.[17] The seven variables were: the total scores on each of the STEP Reading, Writing, and Listening tests, the scores on both the SCAT verbal and non-verbal tests, chronological age, and the socio-economic score as given by the Occupational Class Scale.

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[17] M. A. Efroymson, "Multiple Regression Analysis," Mathematical Methods for Digital Computers, eds. A. Ralston and H. S. Wilf (New York: John Wiley & Sons, Inc., 1960), pp. 191-203.

One-Way Analysis of Variance. To test the significance of variations in student performances on the Connectives Reading Test a one-way analysis of variance by each of grades four, five, and six was carried out on total student scores and on the scores for each of the seventeen groups of connective test items. The means of the five achievement groups in each grade were also ordered and a Newman-Keuls comparison completed.[18]

Three-Factor Experiment with Repeated Measures on One Factor. In a further analysis of variance by sex and grade and the Connectives Reading Test,[19] the third factor was composed of two measures, the first of which was test scores for each of the seventeen connectives (the subtests) in turn, and second, the total test scores. The effect of the factors and their interactions could then be determined.

Three-Way Analysis of Variance. Adding the variable of population strata to those of sex and grade, an additional analysis of variance was made on the total test scores of students.[20]

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[18] B. J. Winer, Statistical Principles in Experimental Design (Toronto: McGraw-Hill Book Company, Inc., 1962), pp. 48-55.

[19] Ibid., pp. 347-355.

[20] Program adapted for use on the University of Alberta IBM 7040 system by S. Hunka, M. Wahlstrom, and J. Carlson from Applied Multiple Linear Regression by Robert A. Bottenberg and Joe H. Ward, Jr. (Technical Documentary Report PRL-TDR-6306, March 1963), from the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce.

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The Analysis of Covariance

Using the five variables which the stepwise multiple regression analysis had shown predicted the major portion of the total score on the Connectives Reading Test, an analysis of covariance was completed to determine whether the initial differences these variables effected were important to the final scores of the Connectives Reading Test.[21]

Factor Analysis

A principal-axis factor analysis was undertaken to ascertain whether the variance of the Connectives Reading Test scores could be accounted for by a number of smaller basic categories than the factor in the test, the presence of a connective(s) in each test item.[22]

The Written Connectives Test

Three markers, the investigator and two other experienced elementary school teachers, assessed the work of 394 students who completed the test. They used a common basis for marking previously decided upon by them but they worked independently. The children's answers for each test item had been previously ordered so all marking for one test item could be done at the same time. After the marking had been completed, the scores for individual children were totalled.

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[21] Ibid.

[22] J. H. Wilkinson, "Householder's Method for the Solution of the Algebraic Eigen Problem," Computer Journal, 3, April 1960, pp. 23-27.

The twenty test items contained thirty-three answer blanks so total test scores ranged from zero to thirty-three.

To find out if the three markers were applying essentially the same standard in ranking the children, the Kendall Coefficient of Concordance:W was computed. With the total test scores of 394 students spread over the comparatively narrow range of thirty-three marks, large numbers of tie marks were inevitable resulting in the use of a correction factor for them. The formula for large samples was also utilized.[23]

The Kendall Coefficient of Concordance:W was .936. This value was high with $p < .001$ indicating that there was almost complete agreement in the criteria used to judge the children's papers.[24]

Student scores were grouped by grade, sex and population strata so comparisons with the scores of the *Connectives Reading Test* could be made.

The Isolation of Possible Patterns of Language Difficulties in Test Items

The percentages of certain language elements and structures in each test item by designated difficulty index ranges were computed to isolate possible patterns of language difficulties in the test items.

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[23] Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences* (Toronto: McGraw-Hill Book Company, Inc., 1956), pp. 228-239.

[24] *Ibid*. p. 249.

SUMMARY

In the treatment by subjects research design for this study, the treatment was the Connectives Reading Test and the subjects were 402 children, a stratified random sampling from students in grades four to six, aged eight to twelve, in Alberta elementary schools.

Data were collected from the Connectives Reading Test and from the sources which controlled the seven variables statistically. Achievement in listening, reading, and written language, were controlled through STEP Listening, Reading, and Writing Tests and mental ability through SCAT. A socio-economic status score of the parent was taken from the Occupational Class Scale, and the chronological age and sex of each student were recorded.

From the item analyses, the correct answers of students and their errors on the Connectives Reading Test were computed in percentages by grade for the total test, for the test items representing groups of connectives and for those representing each of the seventeen connectives.

Showing the relationships among the tests scores of the Connectives Reading Test and between them and certain variables, was accomplished by using correlations, including a stepwise multiple regression analysis.

To assess the significance of the variations of student scores a number of statistical techniques were used. Three analyses of variance by grade, adding sex and population strata in turn, showed the effect of each on total test scores and on the scores of the seventeen subtests of the Connectives Reading Test. The principal-axis factor analysis determined whether these variations in scores could be accounted for by a number of smaller basic categories than the dependent variable, the presence of a connective(s) in test items.

The covariants which had been isolated as those predicting the major portion of the total test scores were used in an analysis of covariance to find out the importance of their differences.

The Written Connectives Test was scored by three markers. As the Kendall Coefficient of Concordance:W showed that they were using the same standards in marking the test items, comparisons among student test scores were planned.

To complete the analysis of the Connectives Reading Test scores, the isolation of possible patterns of language difficulties was attempted through the rearrangement of test items according to difficulty indexes, and the identification of some of their language features.

CHAPTER VI

FINDINGS: THE ANALYSES OF CONNECTIVES

This chapter will present the analyses of connectives with the main sections as: the reliability of the _Connectives Reading Test_, student achievement on the same test, a description of student membership in five groups set up according to their achievement on the _Connectives Reading Test_, and an ordering of some of the most difficult test items by grade.

The description of student performance will be given in percentages, both for correct answers and for errors made.

I. RELIABILITY OF THE _CONNECTIVES READING TEST_

The results of the item analysis of the pilot study are compared to those of the main investigation in Table XX.

TABLE XX

RELIABILITY OF _CONNECTIVES READING TEST_

Pilot Study (199 test items)	Kuder-Richardson formula 20
Pre-test --- grades 4 - 6	0.984
Post-test -- grades 4 - 6	0.991
Main Investigation (150 test items)	
Test --- grades 4 - 6	0.968
Test --- grade 4 only	0.966
Test --- grade 5 only	0.974
Test --- grade 6 only	0.962

The high reliability coefficients throughout both investigations indicated that the items of the Connectives Reading Test were highly intercorrelated with each other thus giving a satisfactory countercheck on the reliability of the test.

Table XXI gives details of the test performances of student groups. The progressive ability of students from grades four to six to answer test items correctly is mirrored in the increase of the test means and in the narrowing range of scores in the higher achievement groups.

The range of scores was wide in the main investigation with nearly one-fifth of the students getting less than one-third of the items right and no one in the highest achievement group tallying more than 144/150 items correct. A wide spread of marks was apparent, too, at each grade level with this spread widening at the lowest achievement levels and narrowing at the higher levels. The same trend was reflected in the smaller test variance in grade six. The vocabulary control set at mid-point in grade five and the additional year of mental development could account for this narrower range of scores.

II. STUDENT ACHIEVEMENT ON THE CONNECTIVES READING TEST

From Figure 1, page 153, it can be seen that the children in these three grades comprehended two-thirds of the test items. The

TABLE XXI

PERFORMANCE OF STUDENT GROUPS ON CONNECTIVES READING TEST

Grade	No. of Students	Test Mean	Test Variance	Standard Deviation	Achievement Groups: Name	Number in Group*	Range of Scores	Range in Marks
4 - 6	402	99.10	899.59	29.99	upper 5	89	126 - 144	18
					upper 4	72	115 - 125	10
					upper 3	81	96 - 114	18
					upper 2	80	69 - 95	26
					upper 1	80	27 - 68	41
4	134	85.45	809.16	28.45	upper 5	32	113 - 135	22
					upper 4	25	94 - 112	18
					upper 3	25	76 - 93	17
					upper 2	25	55 - 75	20
					upper 1	27	27 - 54	27
5	134	98.75	943.19	30.72	upper 5	29	127 - 144	17
					upper 4	28	113 - 126	13
					upper 3	24	94 - 112	18
					upper 2	26	67 - 93	26
					upper 1	27	30 - 66	36
6	134	113.10	563.80	23.74	upper 5	30	131 - 144	13
					upper 4	28	123 - 130	7
					upper 3	26	114 - 122	8
					upper 2	23	98 - 113	15
					upper 1	27	57 - 97	47

* The number of students in each achievement group varied due to the concentration of student scores at the points where the group divisions were made.

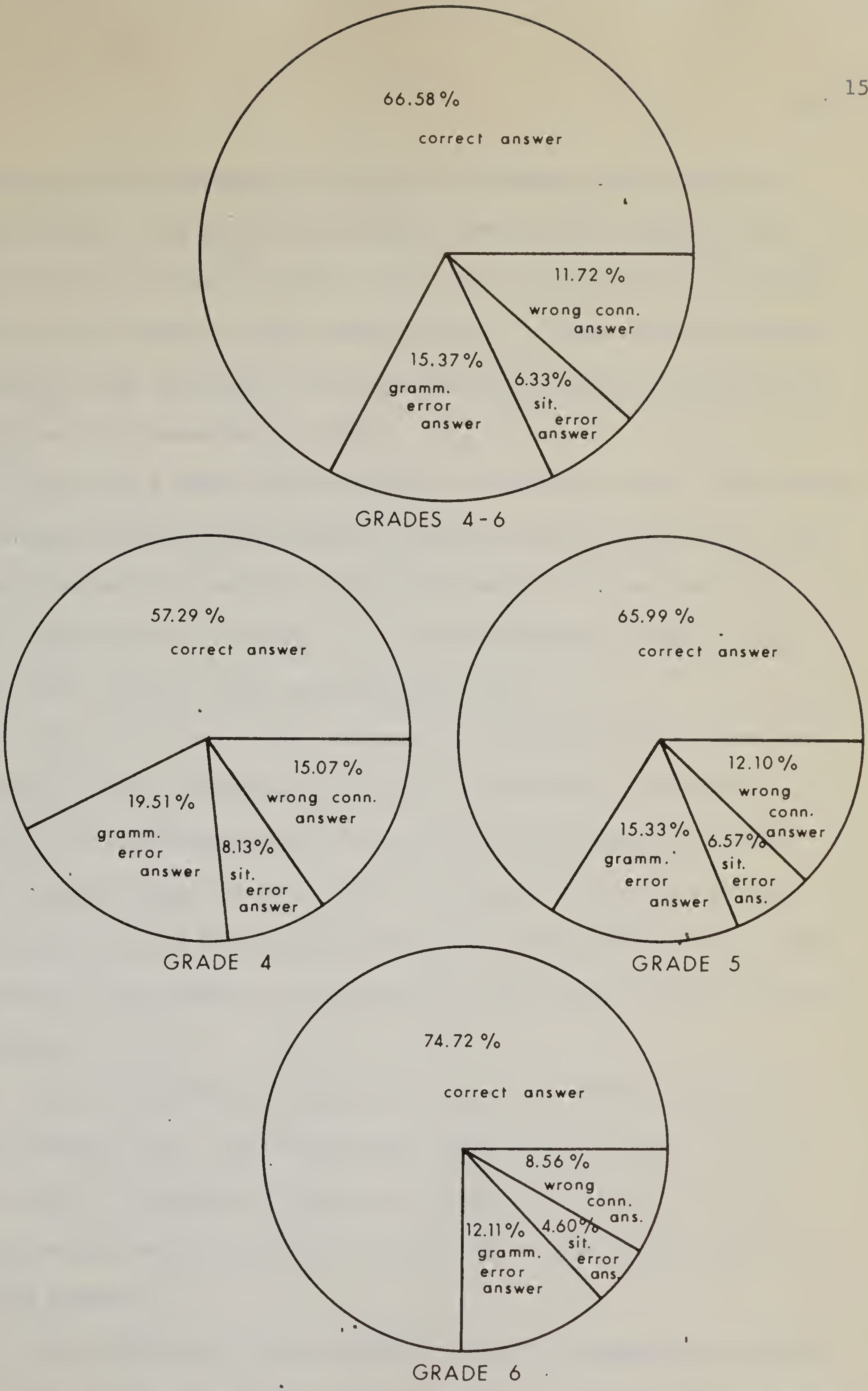

Fig 1 STUDENT ANSWERS ON <u>CONNECTIVES READING TEST</u>

adequacy of this comprehension level is a question that educators should ponder. The grade four students comprehended slightly more than one-half of what they read, grade five students about two-thirds, and grade six students almost three-quarters. These students appeared to develop from one grade to the next in their ability to comprehend sentences with connectives in them.

The errors made could be ordered according to type. The greatest percentage of errors was grammatical with a slightly smaller per cent of wrong connective answers. The situational errors were made the least, approximately one-half of the wrong connective answers. The same order of errors held at each grade level.

From a practical point of view the students may need additional training in looking more carefully at the words they read because failure to note grammatical errors in print could eventually reduce their reading comprehension. The low constant rate among the situational errors could be accounted for by the exaggeration of situations in the test item answers, to the point at which most children would not be misled.

The relationship of one type of error to another appeared to hold constant also. The wrong answers were approximately 4 per cent lower than the grammatical type errors while the situational errors accounted for approximately one-half as many errors as the wrong connective answers.

Table XXII of all the students' answers by <u>connective classes</u> showed that the percentage of correct answers hovered around the average,

TABLE XXII

SUMMARY OF STUDENTS' ANSWERS ON CONNECTIVES READING TEST

Students: No. and Grade	Connective Class	No. Conn. in Test Items	No. Test Items	Percentage of Students who Chose: Answers Correct	Grammatical Error	Situational Error	Wrong Conn.
402 in Grades 4, 5, 6	Subordinate Simple Includer Clause Conn. (although, because, if, so, that, when, where)	Single	33	69.22	16.73	5.66	8.39
		Multi-Conn.	30	70.57	12.87	6.64	9.92
			63	69.86	14.90	6.13	9.12
	Subordinate Clause-Relative Pronouns (that, which, who)	Single	17	66.01	16.59	5.13	12.27
		Multi-Conn.	11	67.19	15.10	6.41	11.30
			28	66.47	16.00	5.63	11.89
	Subordinate Clause Conn.-"Absent"	Single	7	69.95	16.51	5.83	7.71
		Multi-Conn.	2	73.58	13.28	3.03	10.11
			9	70.76	15.79	5.21	8.25
	Co-ordinate Clause Conn. (and, but, for, yet)	Single	21	68.19	14.06	5.89	11.85
		Multi-Conn.	15	63.90	15.36	8.48	12.27
			36	66.40	14.60	6.97	12.03
	Sentence Linkers (however, thus)	Single	7	53.54	13.81	7.30	25.34
		Multi-Conn.	7	55.93	17.89	5.91	20.27
			14	54.74	15.85	6.61	22.80

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66.58 per cent, presented in Figure 1. The exception was the sentence linkers which fell about 12 per cent below this figure. Thus, in the primary breakdown of student achievement scores the first evidences of deviations from the total comprehension figure were recorded. One class of connectives, the sentence linkers, departed markedly from the gross total comprehension for all connectives.

The per cent of correct answers for both the single and the multi-connective answers differed from each other, however, by little more than 1 per cent with the exception of the "absent" connectives and the co-ordinate clause connectives. In the "absent" connective test items, students answered those with multi-connectives correctly, 4 per cent more often than they did those with single connectives. In the co-ordinate connective test items the reverse was true.

Except for the connective class of sentence linkers, the same order for error type remained as reported in Figure 1, page 153. Grammatical errors were made most frequently, followed by wrong connective answers. This order was reversed with sentence linkers. Situational errors were made the least with the percentages hardly varying more than 1 per cent from the average figure of 6.33 per cent noted previously.

Relationships among the three types of errors varied a great deal more than the 4 per cent reported in Figure 1. The differences between single connective test items and the multi-connective items, too, advanced to 5 per cent with neither one or the other consistently higher.

Table XXIII summarized students' answers by both connective class and grade. Without exception the percentages of grade four correct answers were lower than those for grade five which in turn

TABLE XXIII

SUMMARY OF STUDENTS' ANSWERS ON CONNECTIVES READING TEST BY GRADE

Students: No. and Grade	Connective Class	No. Test Items	Grade	Percentage of Students who Chose: Answers			
				Correct	Grammatical Error	Situational Error	Wrong Conn.
134 in each of Grades 4, 5, 6	Subordinate Simple Includer Clause Conn. (although, because, if, so, that, when, where)	63	4	60.32	19.61	7.91	12.16
			5	68.99	15.10	6.51	9.41
			6	77.14	11.30	4.90	6.66
	Subordinate Clause Conn. - Relative Pronouns (that, which, who)	28	4	54.86	21.24	7.92	15.98
			5	65.41	15.80	5.97	12.82
			6	75.14	13.28	3.38	8.20
	Subordinate Clause Connective "Absent"	9	4	62.29	18.46	7.84	11.41
			5	70.71	16.17	4.86	8.26
			6	76.72	12.14	3.39	6.15
	Co-ordinate Clause Connective (and, but, for, yet)	36	4	58.16	18.19	8.54	15.11
			5	64.79	14.86	7.60	12.74
			6	73.58	11.91	5.14	9.36
	Sentence Linkers (however, thus)	14	4	43.10	19.64	8.69	28.58
			5	53.73	16.10	6.56	23.60
			6	64.59	12.94	5.05	17.42
	Totals		4	57.29	19.51	8.13	15.07
			5	65.99	15.33	6.57	12.10
			6	74.72	12.11	4.60	8.56

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

were lower than those in grade six. This strong developmental aspect was noted also in the three types of errors where the percentages for grade four were higher than those for grade five which in turn were higher than those in grade six.

Consistent with the results of Table XXII, at each grade level grammatical errors were made the most often, followed by wrong connective answers and situational error answers in that order. Here, too, the sentence linker items drew more wrong connective answers than grammatical errors.

A summary of all the students' answers on the Connectives Reading Test grouped according to each of the seventeen connectives is given in Table XXIV. The percentage of correct answers varied with each one of the seventeen connectives. The range of comprehension was from 45.23 per cent correct answers on the items testing "thus," to 77.61 per cent on "so" test items. With the breakdown of connective classes into the individual component parts of each connective, a wider variation in comprehension levels from previous observations was noted.

Fourteen of the seventeen connectives maintained the same order of type of error noted previously, in which the grammatical error exceeded first, the wrong connective answer, and secondly, the situational error answers. In the items which tested the connectives "yet," "however," and "thus," the wrong connective answer exceeded grammatical error answers. Sentence linkers appear to be the hardest connective group to understand so they would attract more wrong

TABLE XXIV

SUMMARY OF STUDENTS' ANSWERS ON CONNECTIVES READING TEST BY CONNECTIVES

Connective	Number Conn. in Test Items	Number Test Items	Percentage of Students Who Chose: Answers			
			Correct	Grammatical Error	Situational Error	Wrong Conn.
although	single	4	58.54	20.82	5.06	15.57
	multi-conn.	6	60.90	17.31	4.90	16.89
		10	59.96	18.71	4.97	16.36
because	single	5	62.16	19.65	6.23	11.96
	multi-conn.	5	74.62	9.84	6.91	8.63
		10	68.38	14.75	6.57	10.30
if	single	4	72.30	18.84	4.46	4.40
	multi-conn.	5	70.95	13.16	8.98	6.91
		9	71.55	15.69	6.97	5.79
so	single	5	75.45	15.32	4.28	4.94
	multi-conn.	4	80.36	8.51	3.77	7.36
		9	77.61	12.32	4.06	6.01
that (simple includer)	single	2	76.08	11.90	4.68	7.34
	multi-conn.	3	67.89	17.29	5.20	9.63
		5	71.18	15.12	4.99	8.71
when	single	5	67.37	12.47	9.90	10.25
	multi-conn.	4	69.33	11.27	10.63	8.77
		9	68.24	11.94	10.22	9.60

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

TABLE XXIV (continued)

Connective	Number Conn. in Test Items	Number Test Items	Percentage of Students Who Chose: Answers Correct	Grammatical Error	Situational Error	Wrong Conn.
where	single	8	72.95	16.52	4.67	5.86
	multi-conn.	3	73.99	12.04	5.72	8.25
		11	73.23	15.30	4.96	6.51
that (relative pronoun)	single	8	67.80	13.65	5.24	13.31
	multi-conn.	4	67.36	12.74	8.24	11.66
		12	67.65	13.35	6.23	12.76
which	single	4	67.09	14.18	5.82	12.91
	multi-conn.	4	58.92	21.48	5.84	13.76
		8	62.99	17.84	5.83	13.34
who	single	5	62.28	23.24	4.41	10.08
	multi-conn.	3	77.92	9.75	4.75	7.58
		8	68.19	18.14	4.54	9.13
"absent" conn.	single	7	69.95	16.51	5.83	7.71
	multi-conn.	2	73.58	13.28	3.03	10.11
		9	70.76	15.79	5.21	8.25
and	single	6	62.97	19.40	6.09	11.55
	multi-conn.	3	61.04	13.38	8.28	17.31
		9	62.34	17.39	6.82	13.48

TABLE XXIV (continued)

Connective	Number Conn. in Test Items	Number Test Items	Percentage of Students Who Chose: Answers Correct	Grammatical Error	Situational Error	Wrong Conn.
but	single	6	70.73	10.90	6.36	12.01
	multi-conn.	4	62.72	22.23	7.05	8.00
		10	67.50	15.46	6.64	10.39
for	single	5	74.25	12.30	4.97	8.48
	multi-conn.	4	66.75	14.32	5.93	13.00
		9	70.93	13.20	5.40	10.48
yet	single	4	64.67	12.97	6.05	16.31
	multi-conn.	4	64.38	11.01	12.59	12.02
		8	64.53	12.00	9.32	14.16
however	single	4	61.33	10.70	7.53	20.44
	multi-conn.	4	62.37	12.15	6.36	19.13
		8	61.85	11.42	6.94	19.79
thus	single	3	43.17	17.96	7.00	31.87
	multi-conn.	3	47.30	25.59	5.32	21.79
		6	45.23	21.77	6.16	26.84
Total for 17 Conn.	Single	85	67.10	15.78	5.76	11.36
	Multi-Conn.	65	66.96	14.38	6.84	11.82
		150	67.04	15.18	6.23	11.56

connective answers. With "yet," the necessity of holding information units for consideration later in the sentence may account for the reversal in error order. In addition, the "when" and "yet" connective items showed a greater percentage of situational error answers than other connective groupings.

Upon comparison of the percentages of correct answers for single connective test items with multi-connective items, no consistent pattern was evident yet. For seven connectives only, the percentage of correct answers in single connective test items exceeded that of multi-connective test items. That is, on the test items which represented ten connectives, the majority of the connectives investigated, students correctly answered multi-connectives test items more often than they did single connective test items. Although multiplicity of connectives in a test item may be one of several factors causing reading difficulties in sentences, it does not appear to be an important single factor.

Differences in the percentages noted at the bottom of Table XXIV from the percentages given in Figure 1, page 153 can be accounted for in the rounding of each percentage to two decimal places.

For each grade level, Figures 2 to 7 summarized student performance on the test items grouped according to the seventeen connectives. The percentage figures are given in table form in Appendix C.

Each graph supported previously noted achievement trends and further illuminated them by revealing additional individual variations

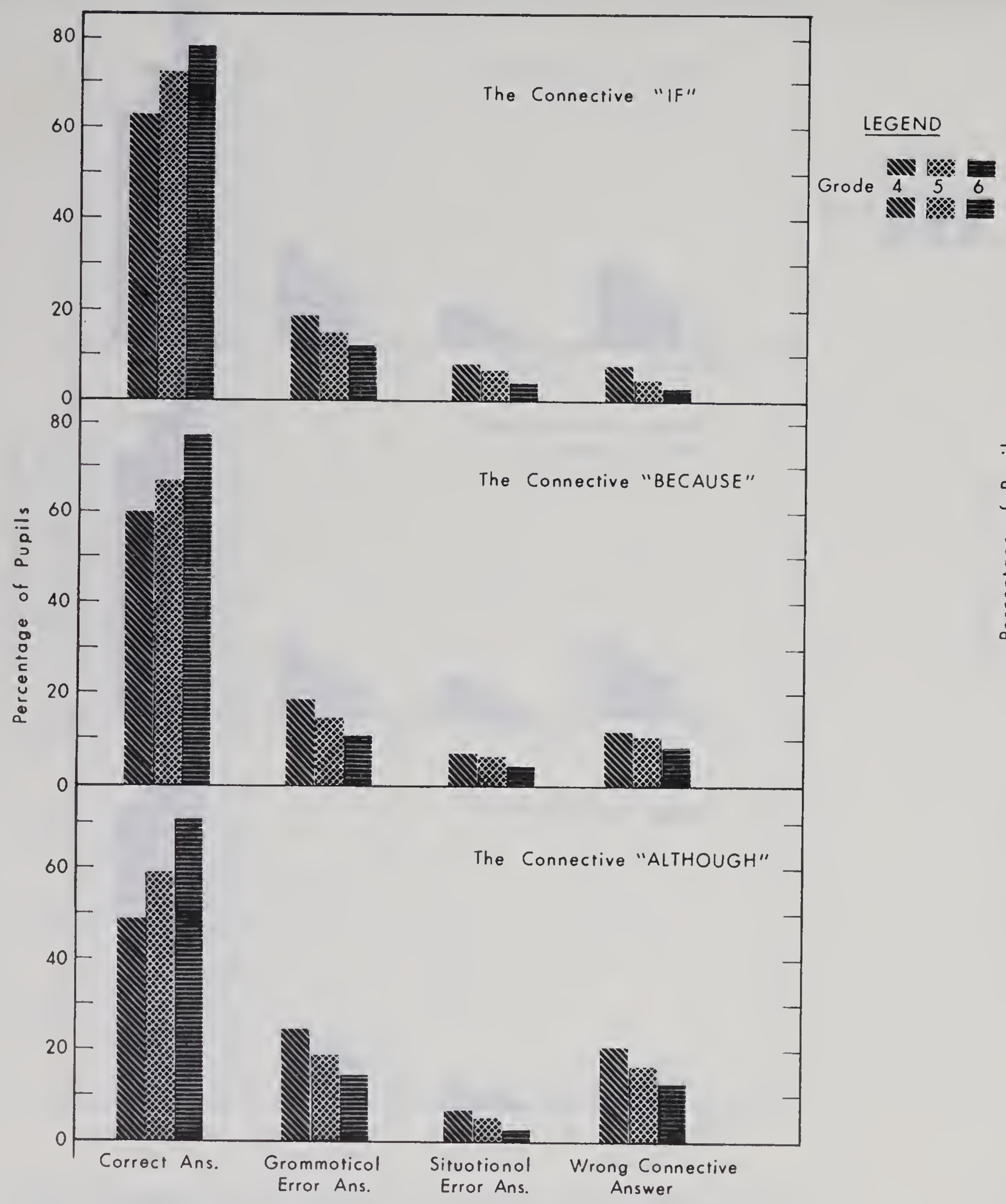

Fig. 2 ANSWERS OF THE PUPILS ON THE CONNECTIVES READING TEST

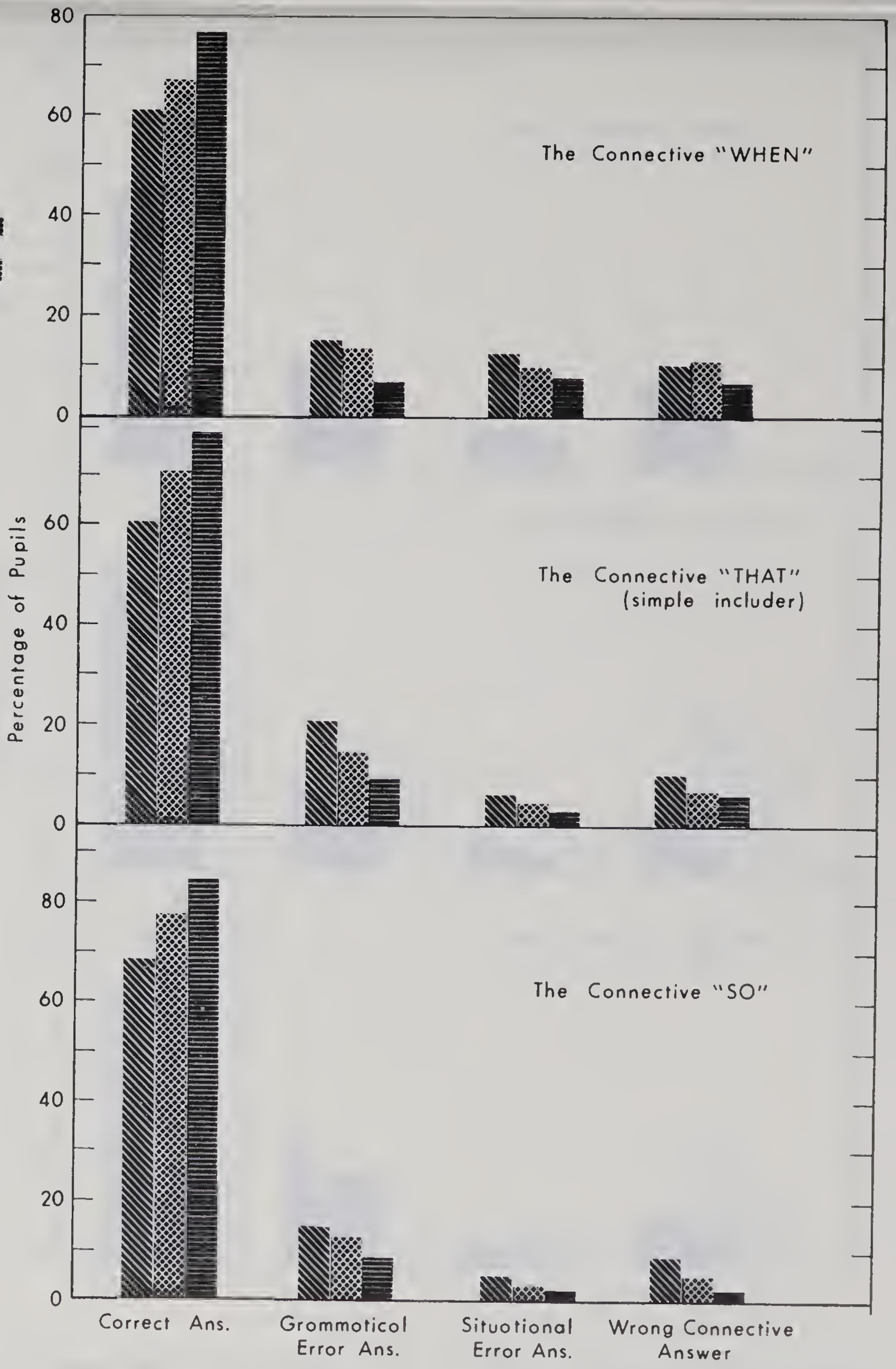

Fig. 3 ANSWERS OF THE PUPILS ON THE CONNECTIVES READING TEST

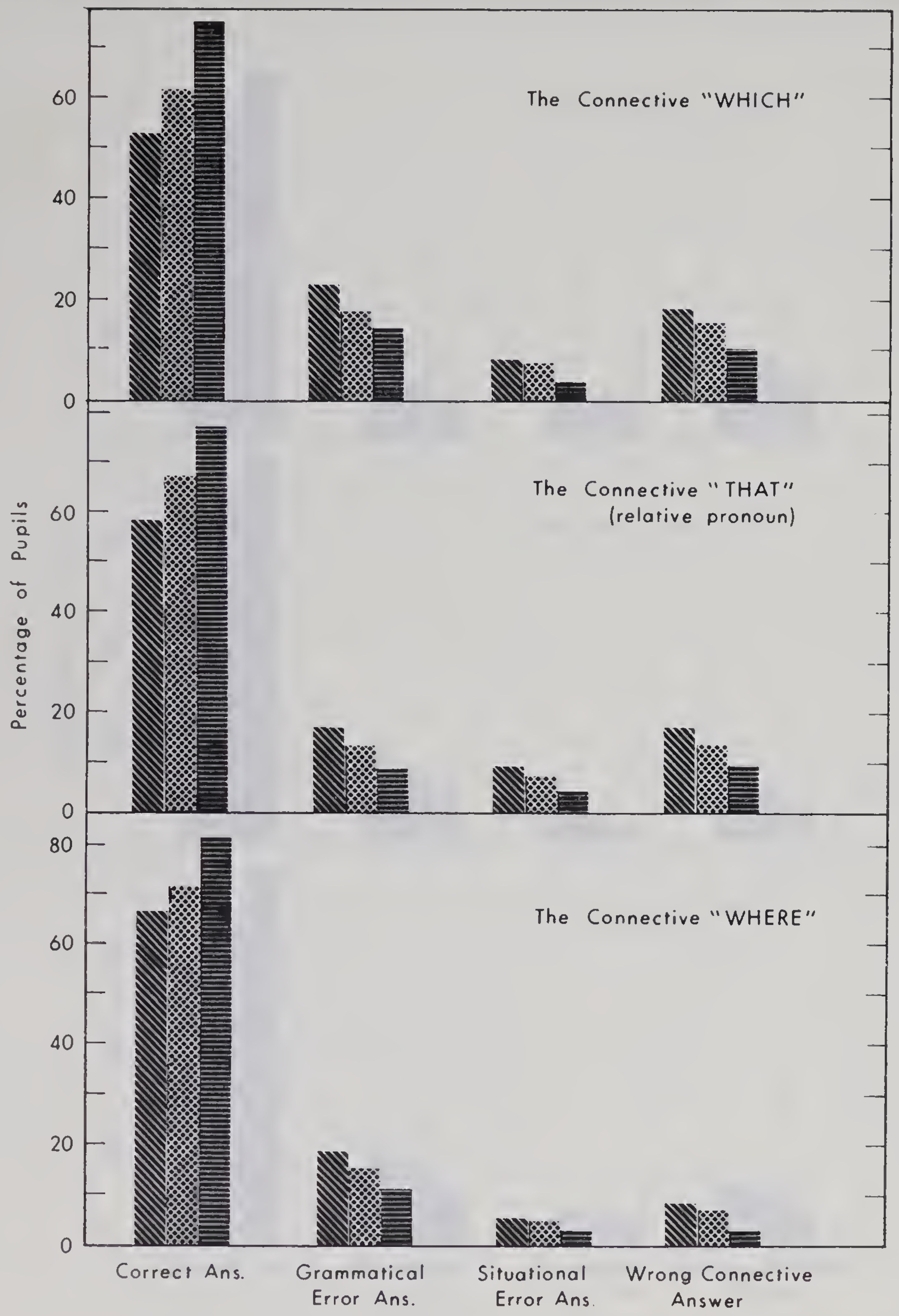

Fig. 4 ANSWERS OF THE PUPILS ON THE CONNECTIVES READING TEST

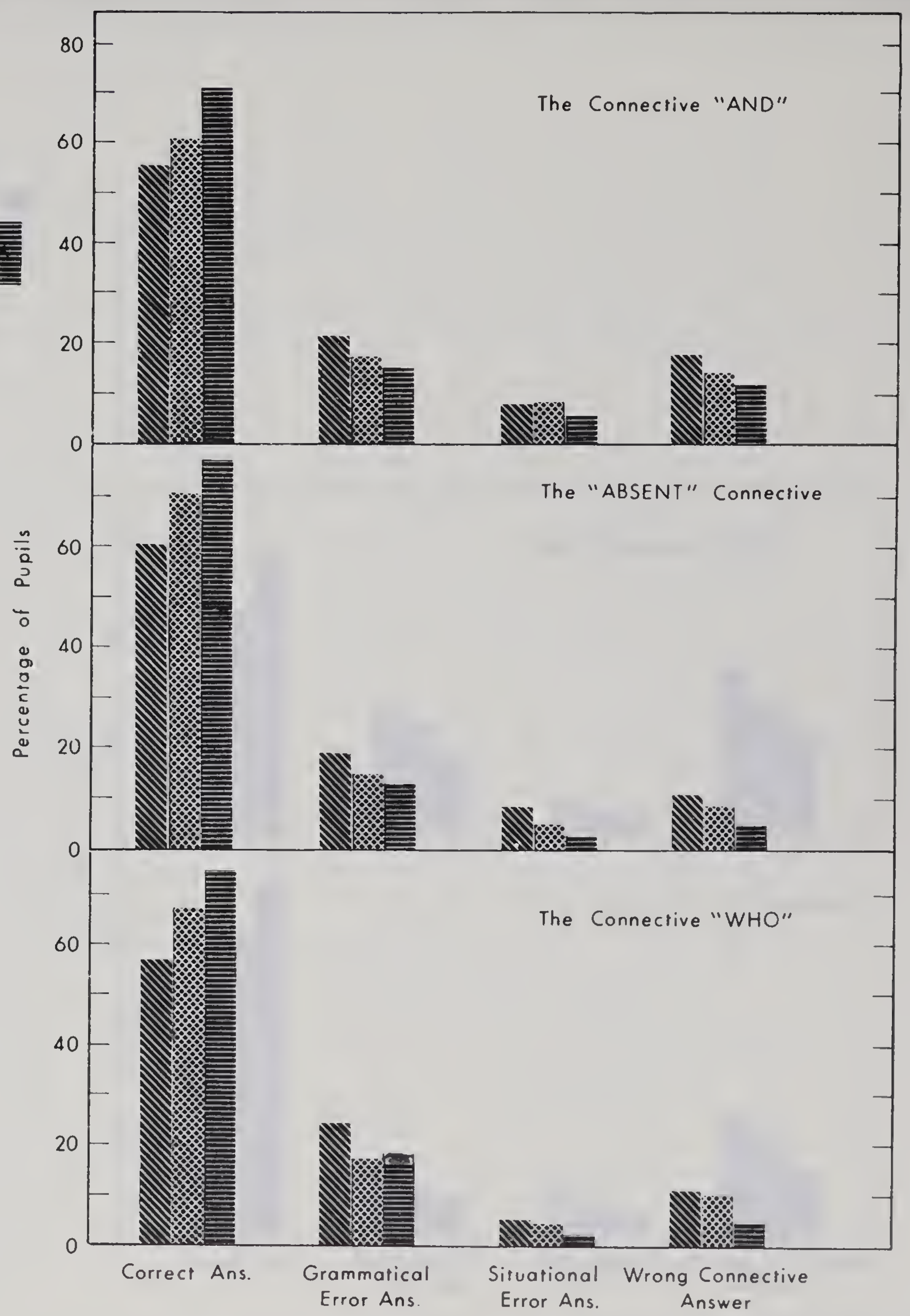

Fig. 5 ANSWERS OF THE PUPILS ON THE CONNECTIVES READING TEST

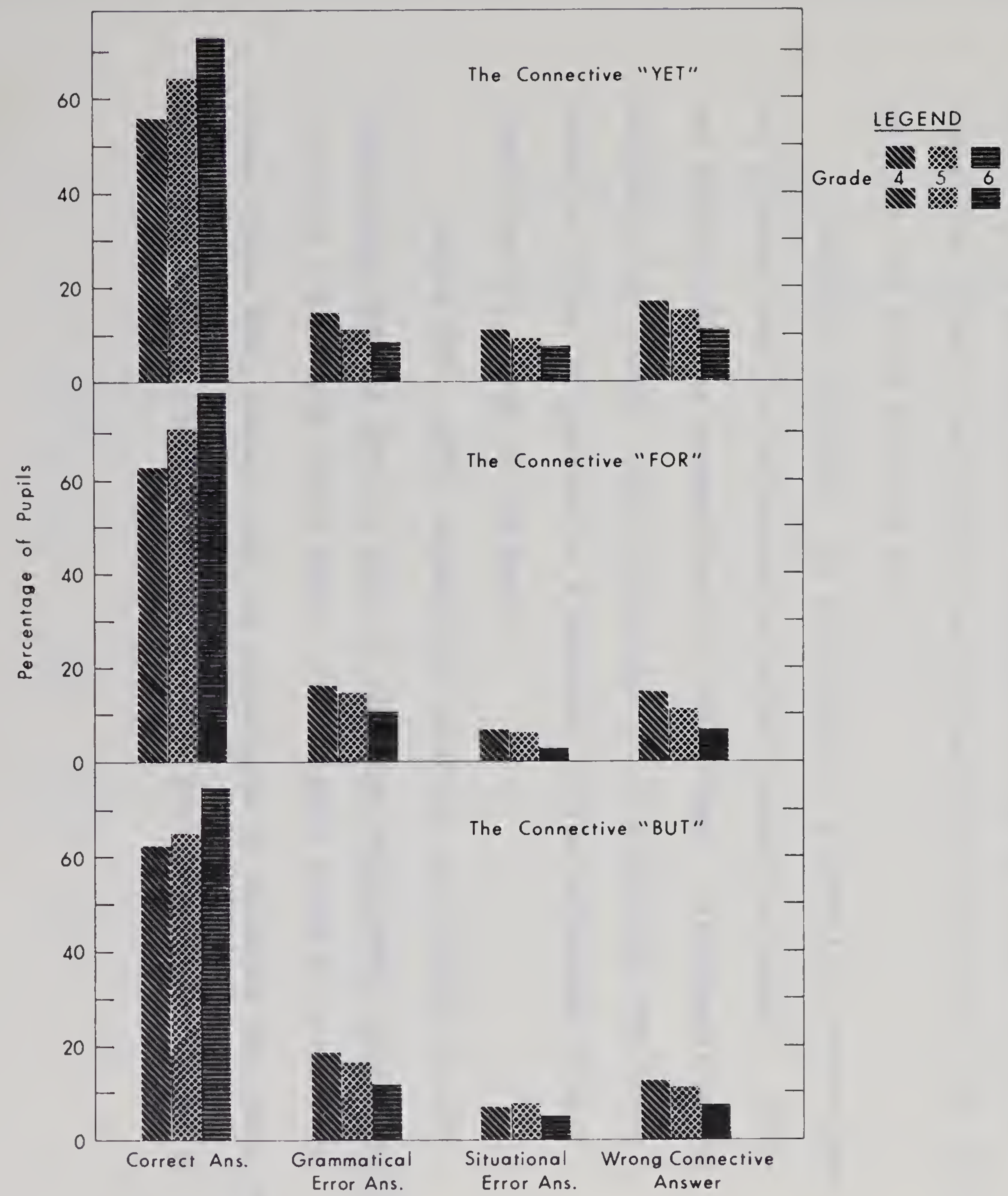

Fig. 6 ANSWERS OF THE PUPILS ON THE <u>CONNECTIVES READING TEST</u>

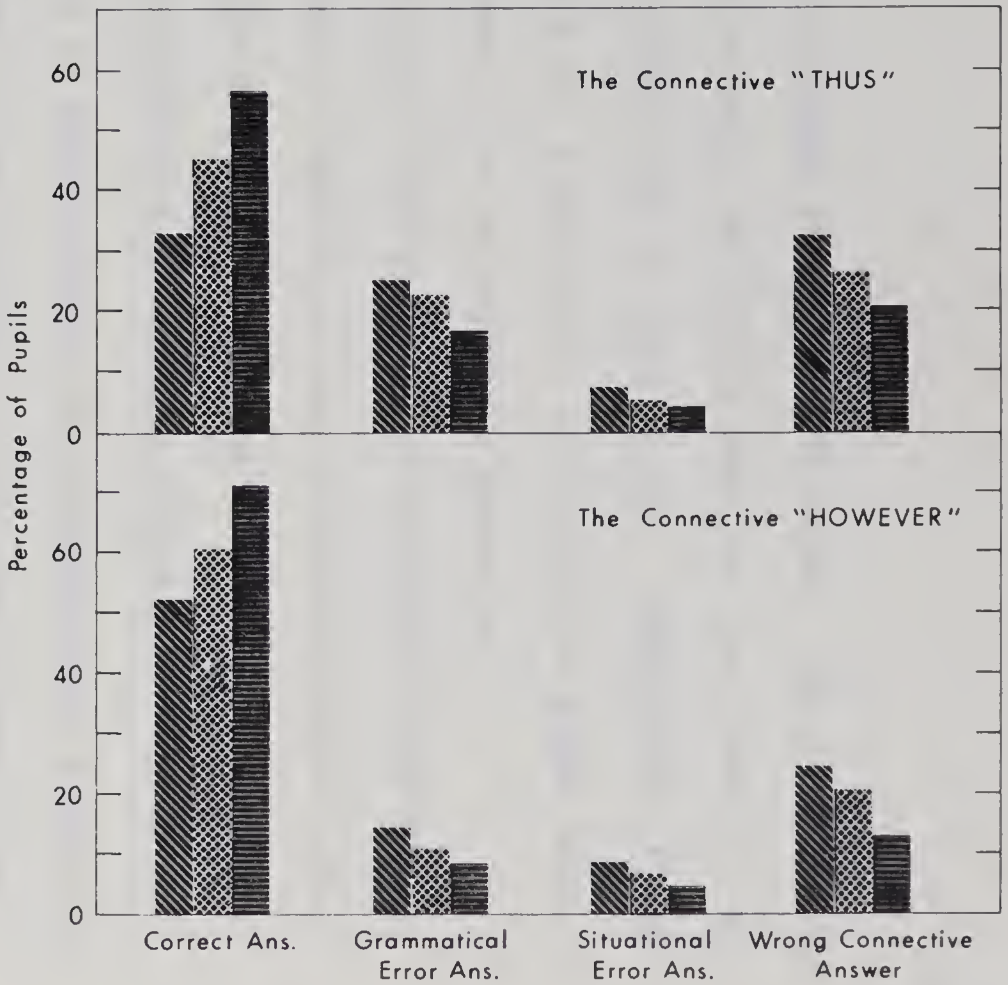

Fig. 7 ANSWERS OF THE PUPILS ON THE <u>CONNECTIVES READING TEST</u>

within the connective classes at each grade level. The students consistently progressed in their ability to read the test items of any one connective from grades four to five to six. Regardless of the level of understanding for a particular connective in grade four, that level rose in grade five and again in grade six.

The rate with which understanding of different connectives develops from one grade to another is not consistent either. The students showed a greater growth from grade four to five for some connectives and from grade five to six for others.

The percentage of understanding was different for each connective at a grade level. For example, in the test items of the connective "thus," the level of understanding at grade four was 33.33 per cent and 69.38 per cent for "so."

Generally speaking, the percentage of grammatical errors made was greater than the percentage of wrong connective answers. With two exceptions, the connectives "if" and "when," situational errors were made the least. Only four times out of fifty-one, was there a deviation from the pattern of a decrease in the percentage of any error from one grade to the next.

Tables XXV - XXVII summarized students' performance on the <u>Connectives Reading Test by each of the five achievement groups across</u> the three grades and within them. The summary table by connective class, Table XXV, showed that the percentage of students who chose the correct answer in the highest achievement group rarely dipped below

TABLE XXV

SUMMARY OF STUDENTS' PERFORMANCE IN EACH ACHIEVEMENT GROUP ON THE CONNECTIVES READING TEST

Connective Class	Grade and No. Students	Percentage of Students Who Chose: Correct Answer					Percentage of Students Who Chose: Grammatical Error Answer					Percentage of Students Who Chose: Situational Error Answer					Percentage of Students Who Chose: Wrong Connective Answer				
		Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1
Subordinate	4(N=134)	85.01	71.44	63.65	49.40	32.10	9.00	17.52	21.20	24.01	26.33	2.10	4.56	5.53	8.82	18.56	3.90	6.48	9.62	17.77	23.01
Simple Includer	5(N=134)	91.95	82.44	74.11	61.54	34.89	4.32	10.27	14.93	19.94	26.02	1.64	2.52	4.51	7.02	16.85	2.08	4.76	6.46	11.51	22.24
Clause Connective	6(N=134)	90.81	86.43	82.44	73.23	52.80	3.56	7.27	9.09	15.33	21.24	3.87	1.99	3.13	4.30	11.22	1.76	4.32	5.34	7.14	14.74
(although, because, if, so, that, when, where)	4-6 (N=402)	91.18	83.37	74.23	61.51	36.71	4.63	9.56	15.35	20.39	25.63	1.79	2.56	4.02	6.90	15.84	2.41	4.51	6.40	11.21	21.82
Subordinate Clause	4(N=134)	82.31	67.73	52.86	40.32	31.07	8.96	16.50	22.69	29.10	28.95	2.58	3.62	7.76	8.57	17.09	6.16	12.16	16.69	22.01	22.88
Relative Pronouns	5(N=134)	89.90	84.04	68.07	51.10	33.96	5.30	7.46	14.84	23.48	27.92	1.72	1.54	3.30	6.49	16.78	3.08	6.95	13.79	18.92	21.34
(that, which, who)	6(N=134)	93.05	84.63	81.16	67.29	49.60	4.55	8.27	10.73	19.25	23.61	0.84	1.94	1.65	2.82	9.63	1.56	5.17	6.46	10.64	17.15
	4-6 (N=402)	90.43	82.68	70.30	52.11	34.57	5.27	8.56	15.72	23.13	28.28	1.53	1.84	3.03	7.07	15.11	2.77	6.92	10.95	17.69	22.04
Subordinate	4(N=134)	84.27	74.11	66.97	51.87	34.23	12.24	16.52	16.74	23.36	23.42	2.45	3.57	4.07	7.94	21.17	1.05	5.80	12.22	16.82	21.17
Clause Connective	5(N=134)	90.80	83.47	73.68	63.76	41.84	6.90	13.31	17.22	17.47	25.94	1.53	0.81	2.87	6.55	12.55	0.77	2.42	6.22	12.23	19.67
"Absent"	6(N=134)	90.37	87.65	79.74	69.42	56.43	7.78	8.76	13.36	18.45	20.33	-	1.99	2.59	2.43	9.96	1.85	1.59	4.31	9.71	13.28
	4-6 (N=402)	89.11	84.27	73.16	64.96	40.26	7.76	12.46	16.83	18.72	24.13	1.38	1.40	3.20	4.68	15.84	1.75	1.87	6.82	11.63	19.77
Co-ordinate Clause	4(N=134)	83.41	68.83	59.19	47.86	31.50	8.03	14.19	19.17	23.64	25.91	3.84	5.59	5.41	8.34	19.54	4.72	11.40	16.23	20.16	23.05
Connective (and, but,	5(N=134)	89.26	80.52	68.46	54.27	31.45	4.79	9.54	13.83	21.19	24.97	2.78	3.21	4.45	8.22	19.33	3.16	6.73	13.25	16.32	24.24
for, yet)	6(N=134)	90.74	83.10	76.53	69.21	48.33	4.72	7.55	10.93	14.42	21.92	1.57	3.88	4.93	4.48	10.86	2.96	5.47	7.61	11.88	18.89
	4-6 (N=402)	88.06	80.50	70.11	56.00	35.12	5.69	9.09	14.17	19.69	25.25	2.53	4.20	4.53	7.45	16.71	3.72	6.22	11.20	16.87	22.91
Sentence Linkers	4(N=134)	61.43	49.86	38.71	35.01	30.48	11.66	20.06	24.34	20.47	21.65	2.69	3.72	5.87	9.79	21.37	24.22	26.36	31.09	34.72	26.50
(however, thus)	5(N=134)	78.22	67.70	51.82	40.90	30.03	6.68	12.40	18.18	20.73	22.52	2.23	2.84	3.33	6.72	17.69	12.87	17.05	26.67	31.65	29.76
	6(N=134)	86.16	74.68	62.78	56.56	42.78	5.01	9.72	13.61	16.56	19.79	1.43	1.28	3.33	5.31	13.90	7.40	14.32	20.28	21.56	23.53
	4-6 (N=402)	79.65	64.14	53.93	42.70	30.40	6.68	12.79	17.68	20.99	22.15	1.61	2.90	3.84	7.48	17.79	12.07	20.18	24.55	28.83	29.66
TOTALS	4	81.87	68.25	58.45	46.12	31.74	9.20	16.71	21.01	24.51	26.12	2.68	4.49	5.86	8.70	18.93	6.25	10.55	14.69	20.67	23.21
	5	89.58	80.97	69.51	56.06	33.85	4.99	9.95	15.09	20.83	25.79	1.98	2.43	4.06	7.15	17.25	3.45	6.65	11.34	15.96	23.10
	6	90.75	84.27	78.79	69.38	50.41	4.41	7.84	10.51	16.14	21.66	2.31	2.37	3.27	4.05	11.01	2.53	5.52	7.42	10.43	16.92
	4-6	89.09	80.81	70.55	56.88	35.55	5.38	9.73	15.44	20.69	25.62	1.88	2.78	3.89	6.98	16.10	3.65	6.68	10.12	15.44	22.73

[illegible]

TABLE XXVI

STUDENT PERFORMANCE IN EACH ACHIEVEMENT GROUP ON CONNECTIVES READING TEST

Connective	Percentage of Students in Grades 4-6 Who Chose: Correct Answer					Percentage of Students in Grades 4-6 Who Chose: Grammatical Error Answer					Percentage of Students in Grades 4-6 who Chose: Situational Error Answer					Percentage of Students in Grades 4-6 Who Chose: Wrong Connective Answer				
	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1
although	87.53	77.03	61.66	44.15	26.62	7.75	12.04	21.71	25.32	27.66	0.45	1.12	2.36	5.73	15.71	4.27	9.80	14.27	24.81	30.00
because	88.75	80.00	72.46	60.61	37.79	4.50	10.21	14.52	20.83	24.81	2.81	3.08	4.71	8.08	14.55	3.94	6.71	8.31	10.48	22.86
if	92.25	82.04	75.10	66.24	40.03	4.25	12.23	17.11	20.20	25.93	2.25	4.18	5.01	7.06	16.81	1.25	1.55	2.78	6.50	17.24
so	95.75	91.55	84.68	72.96	41.10	2.75	6.26	11.28	17.02	25.33	0.63	0.78	1.67	3.58	14.04	0.88	1.41	2.37	6.44	19.54
that (simple includer)	92.08	86.52	73.57	62.53	38.62	4.75	7.87	16.21	21.71	26.19	0.23	1.69	3.74	5.43	14.55	2.94	3.93	6.48	10.34	20.63
when	90.63	82.74	72.68	58.69	33.77	2.00	7.00	10.00	17.66	24.31	4.00	4.82	9.58	11.97	21.40	3.38	5.44	7.75	11.68	20.52
where	92.12	85.75	79.64	66.78	40.07	5.83	10.05	16.09	20.00	25.35	1.54	2.04	1.69	5.98	13.90	0.51	2.16	2.59	7.24	20.68
that (relative pronoun)	92.69	84.34	70.06	53.50	35.31	3.09	5.57	12.37	19.70	26.91	1.22	1.74	3.64	8.37	16.68	3.00	8.35	13.93	18.43	21.10
which	86.34	77.80	71.89	45.80	30.57	8.31	11.71	15.99	26.47	27.64	1.97	2.27	3.26	6.66	15.45	3.38	8.22	8.85	21.08	26.34
who	91.13	85.04	69.06	56.35	37.42	5.49	9.91	20.47	24.92	30.97	1.55	1.57	1.88	5.56	12.42	1.83	3.48	8.59	13.17	19.19
"absent"	89.11	84.27	73.16	64.96	40.26	7.76	12.46	16.83	18.72	24.13	1.38	1.40	3.20	4.68	15.84	1.75	1.87	6.82	11.63	19.77
and	88.49	74.92	64.55	49.44	31.52	6.01	12.69	17.66	23.38	28.37	2.38	5.11	4.14	7.04	16.05	3.13	7.28	13.66	20.14	24.07
but	87.63	80.81	71.70	59.10	35.66	6.64	10.64	14.34	21.15	25.66	3.71	3.36	4.61	5.26	16.71	2.02	5.18	9.35	14.49	21.97
for	90.24	85.87	72.97	62.45	41.55	4.88	6.83	15.31	17.86	21.63	0.88	2.17	2.76	6.05	15.62	4.01	5.12	8.97	13.64	21.20
yet	85.67	80.35	71.18	52.29	31.29	5.06	5.61	8.72	15.80	25.32	3.09	6.49	6.85	12.16	18.71	6.18	7.54	13.24	19.75	24.68
however	85.79	74.74	63.44	49.52	33.39	3.80	7.02	11.09	16.08	19.84	2.39	3.86	4.84	7.32	16.77	8.02	14.39	20.63	27.07	30.00
thus	71.43	50.12	41.25	33.55	26.36	10.53	20.42	26.46	27.56	25.27	0.56	1.62	2.50	7.69	19.17	17.48	27.84	29.79	31.20	29.19

TABLE XXVII

STUDENT PERFORMANCE IN EACH ACHIEVEMENT GROUP ON THE CONNECTIVES READING TEST
(GRADE BY GRADE)

Connective	Grade	Percentage of Students who Chose: Correct Answer					Percentage of Students Who Chose: Grammatical Error Answer					Percentage of Students Who Chose Situational Error Answer					Percentage of Students Who Chose: Wrong Connective Answer				
		Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1
although	4	77.12	54.80	43.27	36.29	25.10	12.85	27.20	28.98	26.58	28.24	1.57	2.40	4.49	8.02	19.22	8.46	15.60	23.27	29.11	27.45
	5	87.59	76.09	62.61	45.17	22.93	8.28	13.41	18.07	24.32	29.32	0.69	1.09	2.94	6.18	18.42	3.45	9.42	16.39	24.32	29.32
	6	90.33	80.00	77.99	59.57	39.02	7.00	10.36	9.65	21.74	23.48	0.33	-	-	3.48	7.58	2.33	9.64	12.36	15.22	29.92
because	4	78.62	70.16	64.92	49.18	34.94	10.38	17.34	22.98	24.59	23.69	3.77	6.05	5.24	8.61	16.06	7.23	6.45	6.85	17.62	25.30
	5	91.03	79.42	70.17	58.37	37.36	2.76	10.47	13.87	21.79	24.91	2.76	3.25	7.98	7.78	15.09	3.45	6.86	7.98	12.06	22.64
	6	92.00	82.86	80.31	73.04	52.04	3.33	8.93	8.49	14.78	18.96	2.33	1.79	7.34	2.61	13.38	2.33	6.43	7.34	9.57	15.61
if	4	86.81	71.36	68.18	57.01	28.88	10.07	20.45	20.45	21.27	26.29	2.78	4.09	6.82	10.41	20.69	0.35	4.09	4.55	11.31	24.14
	5	93.49	80.80	77.00	70.26	39.33	3.45	12.40	15.96	18.10	27.20	2.68	4.80	5.63	6.90	16.32	0.38	2.00	1.41	4.74	17.15
	6	93.31	86.90	79.83	74.76	54.81	4.09	7.54	12.45	17.48	24.27	0.74	2.78	6.01	4.37	11.72	1.86	2.78	1.72	3.40	9.21
so	4	94.39	82.88	71.43	56.07	35.53	4.56	9.91	17.51	22.43	23.68	0.35	2.70	3.23	7.01	16.23	0.70	4.50	7.83	14.49	24.56
	5	97.32	90.76	87.14	72.84	40.08	1.15	7.63	10.00	18.10	28.27	-	0.40	1.43	3.02	13.08	1.53	1.20	1.43	6.03	18.57
	6	96.30	94.02	88.26	83.01	62.55	2.96	3.59	8.26	12.62	20.43	0.37	1.59	1.30	1.94	10.21	0.37	0.80	2.17	2:43	6.81
that (simple includer)	4	86.62	68.00	63.87	53.10	30.95	10.83	21.60	21.01	26.55	27.78	-	2.40	6.72	6.19	16.67	2.55	8.00	8.40	14.16	24.60
	5	93.10	86.96	73.91	62.50	39.69	4.83	7.25	16.52	22.66	24.43	-	0.72	4.35	5.47	16.79	2.07	5.07	5.22	9.38	19.08
	6	93.33	87.05	86.05	75.65	52.99	2.00	7.19	5.43	13.91	22.39	0.67	1.44	2.33	4.35	9.70	4.00	4.32	6.20	6.09	14.93
when	4	85.26	71.56	69.44	41.40	31.08	6.67	10.55	14.35	23.72	26.13	2.81	11.93	8.80	16.28	25.23	5.26	5.96	7.41	18.60	17.57
	5	91.57	81.53	71.43	53.88	31.06	2.30	6.83	10.95	18.97	24.26	3.45	5.62	9.05	12.07	21.70	2.68	6.02	8.57	15.09	22.98
	6	92.57	84.13	81.97	69.46	52.48	1.12	4.76	7.30	8.87	18.18	4.09	5.16	6.01	12.32	14.05	2.23	5.95	4.72	9.36	15.29
where	4	87.97	80.00	66.30	54.55	37.10	8.02	16.36	21.61	23.86	28.62	2.29	2.18	4.40	4.92	15.90	1.72	1.45	7.69	16.67	18.37
	5	90.91	84.21	77.57	68.77	36.61	6.90	11.84	18.63	16.84	23.39	1.25	1.32	0.76	7.02	16.61	0.94	2.63	3.04	7.37	23.39
	6	94.24	90.55	84.62	78.57	56.66	3.94	7.82	10.14	16.27	21.50	1.21	1.30	2.45	1.98	11.26	0.61	0.33	2.80	3.17	10.58
that (relative pronoun)	4	86.98	69.59	55.10	39.66	30.49	4.43	11.49	19.73	25.17	25.57	2.34	4.39	8.84	9.66	20.00	6.25	14.53	16.33	25.52	23.93
	5	91.95	85.84	66.78	55.48	35.42	2.59	5.42	10.14	19.35	30.41	2.01	0.90	4.20	7.42	15.99	3.45	7.83	18.88	17.74	18.18
	6	96.10	85.89	82.69	65.69	51.37	2.51	4.91	7.69	16.42	19.45	0.56	1.53	2.24	3.65	12.16	0.84	7.67	7.37	14.23	17.02

[illegible]

TABLE XXVII (continued)

Connective	Grade	Percentage of Students Who Chose: Correct Answer					Percentage of Students Who Chose: Grammatical Error Answer					Percentage of Students Who Chose: Situational Error Answer					Percentage of Students Who Chose: Wrong Connective Answer				
		Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1	Upper 5	Upper 4	Upper 3	Upper 2	Upper 1
which	4	74.41	68.84	43.08	39.38	28.50	14.57	16.58	24.62	30.57	29.50	3.15	4.52	8.72	7.77	16.00	7.87	10.05	23.59	22.28	26.00
	5	86.21	78.73	64.92	45.89	29.11	9.05	9.50	19.90	26.57	24.88	1.29	3.17	3.14	6.28	20.19	3.45	8.60	12.04	21.26	25.82
	6	91.63	82.14	77.78	77.05	44.39	6.69	8.93	13.04	14.21	24.77	0.84	2.68	1.45	2.19	7.94	0.84	6.25	7.73	6.56	22.90
who	4	83.14	63.78	59.28	42.27	34.48	10.20	23.98	25.26	33.51	33.50	2.35	1.53	5.15	7.73	13.79	4.31	10.71	10.31	16.49	18.23
	5	90.52	86.61	73.16	49.76	36.62	5.60	8.48	16.84	26.57	27.23	1.72	0.89	2.11	5.31	14.55	2.16	4.02	7.89	18.36	21.60
	6	89.87	85.27	82.21	59.89	52.09	5.49	12.50	12.98	28.57	28.84	1.27	1.79	0.96	2.20	7.44	3.38	0.45	3.85	9.34	11.63
"absent"	4	84.27	74.11	66.97	51.87	34.23	12.24	16.52	16.74	23.36	23.42	2.45	3.57	4.07	7.94	21.17	1.05	5.80	12.22	16.82	21.17
	5	90.80	83.47	73.68	63.76	41.84	6.90	13.31	17.22	17.47	25.94	1.53	0.81	2.87	6.55	12.55	0.77	2.42	6.22	12.23	19.67
	6	90.37	87.65	79.74	69.42	56.43	7.78	8.76	13.36	18.45	20.33	-	1.99	2.59	2.43	9.96	1.85	1.59	4.31	9.71	13.28
and	4	78.47	63.11	55.11	41.33	27.16	10.76	16.89	19.56	27.56	26.34	4.51	4.44	3.11	8.00	17.28	6.25	15.56	20.44	19.11	23.87
	5	90.04	77.38	59.72	48.72	25.10	4.22	11.51	16.67	23.93	31.28	2.68	3.17	6.48	9.40	17.70	2.68	6.75	15.74	17.09	25.51
	6	92.22	80.16	70.51	65.70	38.27	4.44	9.13	17.09	16.91	26.75	1.11	5.16	4.27	3.87	10.70	2.22	5.56	7.69	13.53	23.05
but	4	86.12	72.18	61.79	52.10	33.33	8.52	14.11	21.14	23.11	27.24	3.15	5.24	4.47	6.30	17.48	2.21	8.47	12.60	18.49	21.95
	5	86.90	80.43	70.76	55.51	30.80	5.86	10.87	16.53	25.98	23.57	5.17	2.54	2.54	5.51	20.15	2.07	6.16	10.17	12.99	25.48
	6	90.67	81.43	77.61	69.43	49.43	5.67	11.43	8.88	15.28	20.15	2.00	3.93	6.18	4.37	12.17	1.67	3.21	7.34	10.92	18.25
for	4	87.11	71.43	63.18	53.46	36.64	6.97	15.18	18.64	22.12	21.98	2.09	4.02	6.36	6.45	18.10	3.83	9.38	11.82	17.97	23.28
	5	91.19	84.74	71.96	60.52	40.34	4.60	8.03	12.62	19.31	19.75	0.77	1.61	2.80	5.15	20.17	3.45	5.62	12.62	15.02	19.75
	6	92.59	88.84	79.40	70.87	59.09	3.70	4.38	9.87	17.96	19.01	-	1.59	3.43	2.91	7.44	3.70	5.18	7.30	8.25	14.46
yet	4	81.42	68.18	55.00	41.67	26.60	5.53	10.10	16.50	20.31	26.60	5.93	9.09	8.00	13.02	25.12	7.11	12.63	20.50	25.00	21.67
	5	88.79	78.38	70.53	51.46	29.44	4.31	7.21	8.42	14.08	25.23	2.16	5.86	6.32	13.59	19.16	4.74	8.56	14.74	20.87	26.17
	6	87.08	82.06	78.37	71.04	45.54	5.00	4.48	7.69	6.56	21.60	3.33	4.93	5.77	7.10	13.15	4.58	8.52	8.17	15.30	19.72
however	4	72.05	64.00	44.90	38.14	35.82	6.69	13.00	18.88	15.98	18.41	3.54	6.00	5.61	11.34	18.41	17.72	17.00	30.61	34.54	27.36
	5	87.01	79.19	56.91	49.75	29.77	3.03	4.98	11.70	12.81	14.88	3.46	4.98	4.26	6.90	14.88	6.49	10.86	27.13	30.54	31.16
	6	88.33	79.46	74.51	64.48	49.77	4.58	4.91	7.35	12.02	14.88	2.08	1.79	2.94	4.92	14.88	5.00	13.84	15.20	18.58	18.14
thus	4	47.40	30.87	30.34	30.77	23.33	18.23	29.53	31.72	26.57	26.00	1.56	0.67	6.21	7.69	25.33	32.81	38.93	31.72	34.97	25.33
	5	66.47	52.41	48.48	29.22	30.38	11.56	22.29	26.76	31.17	20.25	0.58	-	2.11	6.49	21.52	21.39	25.30	26.06	33.12	27.85
	6	83.24	68.26	47.44	45.99	33.33	5.59	16.17	21.79	22.63	23.27	0.56	0.60	3.85	5.84	12.58	10.61	14.97	26.92	25.55	30.82

80 per cent while those in the lowest group rarely reached more than 50 per cent. The other three achievement groups showed the same distinct differences in comprehension along any one of the grade levels. Without exception, the percentage of students who chose the correct answers decreased from those in the highest group to those in the next highest group. That is, not only were there more differences in the comprehension of students as their achievement was studied by connective class and then by individual connective from grade to grade, but along any one of these grade levels, at least five distinct levels of comprehension could be identified in the scores of the five achievement groups for any one of the seventeen connectives.

From one grade level to another, an interesting pattern of growth between the students in the highest achievement group, upper 5, and those in the lowest achievement group, upper 1, was noted. In the upper 5 group, the greater growth indicated by the larger percentage difference took place between grade four and grade five, while for upper 1, the greater percentage difference was between grade five and grade six. For example, for the subordinate relative pronoun clause connective class, there was approximately 7 per cent difference in the number of students who chose the correct answers as against approximately 4 per cent increase from grade five to grade six. In upper 1, however, the increase from grade four to grade five was approximately 2 per cent while that from grade five to grade six was about 16 per cent. Those in the upper level group not only appeared

to comprehend more at an earlier grade but they developed that degree of comprehension sooner than did the lowest achievement group. It is interesting to speculate whether some definite teaching of connectives would accelerate development of understanding for those in the lower achievement groups.

The same patterns of error types were exhibited in the five achievement groups. Those in the highest achievement groups had the lowest percentage of errors and regardless of the figure given for a higher group, the figure for a lower group was almost always higher. In any one achievement group, the greater percentage of error was found at the grade four level, with lesser percentages recorded on each higher grade level. As might be expected in this remarkable set of developmental patterns, the greater drop in error was usually from grade four to five for the highest achievement group and from grade five to six for the lowest group.

For each achievement group too, the order of error types remained the same with grammatical errors occurring most frequently, and situational errors, the least.

As the strong developmental aspect of student comprehension for connectives had been noted first on the test as a whole, then on the same test items when they were grouped according to connective class, and again on the items assembled under seventeen different connectives, the comprehension of students on each one of the one hundred and fifty test items at each grade level was examined to see to what extent this developmental aspect could be seen in each item. (Table XXVIII).

TABLE XXVIII

ANALYSIS OF TEST ITEMS ACCORDING TO DIFFICULTY INDEX

Order of Difficulty Grade by Grade	No. of Items (150 Test Items)	Percentage of Test Items
Items in which progression of difficulty by grade was:		
Grade 4 Grade 5 Grade 6	128	85.33
Grade 4 & 5 (equal difficulty) Grade 6	2	1.33
Grade 4 Grades 5 & 6 (equal difficulty)	2	1.33
Grade 5 Grade 4 Grade 6	13	8.67
Grade 4 Grade 6 Grade 5	2	1.33
Grade 5 Grade 6 Grade 4	3	2.00
Total	150 test items	99.99 per cent

From Table XXVIII it can be seen that the same strong developmental trend extends to the test items individually. More than 85 per cent of them have a steady progression in difficulty from grade four to five to six. Another 3 per cent of the items show a partial development of difficulty in that the test items are of equal difficulty for either grades four and five or for grades five and six with the other grade filling its expected place in order. Only in about 12 per cent of the items was there a definite reversal of order difficulty from that of grade four, five, and six.

An analysis of the eighteen test items which make up this 12 per cent revealed that nine of the items tested the comprehension of co-ordinate clause connectives. Three other multi-connective test items although not testing co-ordinate clause connectives, contained them. Five of the items used "and" and five, "but." The difficulty indexes of the test items indicated that these items were not among the most difficult but for some reason, the students of a higher grade found them harder than the students of a lower grade.

To summarize student achievement as indicated on the connectives analysis of the <u>Connectives Reading Test</u>, the following facts are submitted:

1. Students in the three grades understood about two-thirds of the test items with the grade four students understanding fewer items than this, and the grade six more.

2. Levels of student comprehension for classes of connectives, for each of the seventeen connectives, and for most of the individual test items were all different one from another at any grade level.

3. There was an increase in the comprehension of students from a lower grade to a higher grade with this development of the comprehension level existing in the over-all performance of the entire group, in the items grouped by classes of connectives, in the items designed to test any one of the seventeen connectives, and in 128 of the individual test items.

4. The rate of increase of comprehension for different connectives from grade to grade showed no consistent over-all pattern.

5. Student errors were ordered according to their magnitude. In the whole test, and in the grouping of items according to classes of connectives, the greatest per cent of errors were grammatical, followed by wrong connective answers and then by situational errors. In the items of fourteen of seventeen connectives tested, students made their errors in the same order.

6. The relationships among the error types remained constant grade by grade for the total comprehension of the students on the entire test. However, as the test items were grouped according to connective classes and then again into groups according to the seventeen connectives, a much wider variation was noted. In the first analysis, Figure 1, page 153, the wrong answer connectives were about 4 per cent less than their grammatical errors and the situational

errors were about one-half those of the wrong connective answers. Although these relationships varied greatly, the wrong answer errors were usually much closer in percentage to the grammatical type error than to the situational type error. In the majority of the analyses the situational type errors were consistently low in number.

7. No consistent pattern of student performance on single connective test items or on multi-connective test items was evident.

8. The division of students into achievement groups based on their scores on the test showed that there were at least five distinct achievement groups whose scores followed each of the developmental patterns and relationships noted above.

9. The greater period of growth of student comprehension of a test item was from grade four to five for the highest achievement group, and from grade five to grade six for the lowest achievement group.

III. A DESCRIPTION OF THE STUDENTS IN THE GROUPS SET UP ACCORDING TO ACHIEVEMENT ON *CONNECTIVES READING TEST*

The students were divided by the item analyses into five achievement groups according to their test scores on the *Connectives Reading Test*. To find out who these children were, their ages, grades, socioeconomic status, their mental abilities and their academic achievement

in standardized tests in the language arts, they were compared with the groups established by student achievement on the Connectives Reading Test. For example, Table XXIX shows that the children were formed into four groups according to their chronological age. The children who were eight or nine years of age comprised the first group with those who were ten, eleven, and twelve years old making up one group each. These chronological age groups were then compared to the five achievement groups on the Connectives Reading Test to see how many children from each age group were in the five reading groups.

The students were grouped according to grade, sex, and population strata at the time when the test sample was drawn. Tables XXIX and XXX give the divisions for the STEP - SCAT tests as well as for chronological age and socio-economic status. With the exception of the STEP Writing Test, the marks of the students fell naturally into categories of approximately one-quarter of the student sample. On the writing test, however, the scores were continuous and highly concentrated in the score range of "38 - 60" so the cut was made there even though the group took in more than half the student sample.

As the greater portion of the working population falls within the skilled and semi-skilled groups, class 5 on the Occupational Class Scale, the allotment of 60 per cent of the student group there, is defensible.

TABLE XXIX

CHRONOLOGICAL AGE, MENTAL AGE, AND SOCIO-ECONOMIC STATUS OF CHILDREN IN SAMPLE

Category	Range of Scores In Group	N = 402 Number of Students	Percentage of Students
1. Chronological Age			
a. 8-9 years of age		86	21.39
b. 10 years of age		113	28.11
c. 11 years of age		129	32.09
d. 12 years of age		74	18.41
2. Mental Ability - SCAT Test			
A. Verbal Ability - SCAT raw scores			
a. highest ach. group	44-50	91	22.64
b. second highest ach. group	40-43	109	27.11
c. second lowest ach. group	33-39	84	20.90
d. lowest ach. group	32 and less	118	29.35
B. Non-Verbal Ability			
a. highest group	40-50	93	23.13
b. second highest ach. group	35-39	102	25.37
c. second lowest ach. group	26-34	92	22.89
d. lowest ach. group	25 and less	115	28.61
3. Socio-Economic Status - Occupational Class Scale			
a. professional group	Classes 1, 2	38	9.45
b. managerial group	Classes 3, 4	55	13.68
c. skilled and semi-skilled groups	Class 5	245	60.95
d. low skill and un-skilled groups	Classes 6, 7	64	15.92

TABLE XXX

ACHIEVEMENT OF CHILDREN IN SAMPLE ON STEP LISTENING, READING, AND WRITING TESTS

STEP Tests	Score Range on Test	Number of Students N = 402	Percentage of Students
1. Listening Test			
a. Highest ach. group	70-80	103	25.63
b. Second highest ach. group	64-69	113	28.11
c. Second lowest ach. group	58-63	97	24.13
d. lowest ach. group	57 and lower	89	22.14
2. Reading Test			
a. Highest ach. group	60-70	107	26.62
b. Second highest ach. group	54-59	104	25.87
c. Second lowest ach. group	43-53	96	23.88
d. Lowest ach. group	42 and lower	95	23.63
3. Writing Test			
a. Highest ach. group	38-60	208	51.74
b. Second highest ach. group	29-37	96	23.88
c. Second lowest ach. group	19-28	76	18.91
d. Lowest ach. group	18 and less	22	5.47

Equal numbers of boys and girls from each of grades four, five, and six were made at the time of the test sample draw.

Figures 8 and 9 show who the students are in the five achievement groups of the Connectives Reading Test.

In both the STEP Reading and Listening Tests it is noted that those who scored high in the STEP tests also scored high on the Connectives Reading Test. Similarly, those who scored the lowest on the Connectives Reading Test scored the poorest on the STEP tests.

As might be expected the highest achievement group on the Connectives Reading Test was made up of a higher than average number of students in grade six than in grade four. The grade five students were very well represented in the highest achievement groups but poorly represented in the next higher achievement groups.

The graph for the STEP Writing Test achievement group showed the exceptionally close relationship between this test and the Connectives Reading Test. The lowest achievement group of the STEP Writing Test lacked any representation in the three higher achievement groups of the Connectives Reading Test. However, the memberships of the highest achievement groups were almost identical for the two tests.

The youngest students had the least representation in the highest achievement group of the Connectives Reading Test and the oldest students less representation than some younger. This could be accounted for in the fact that the more able students are often

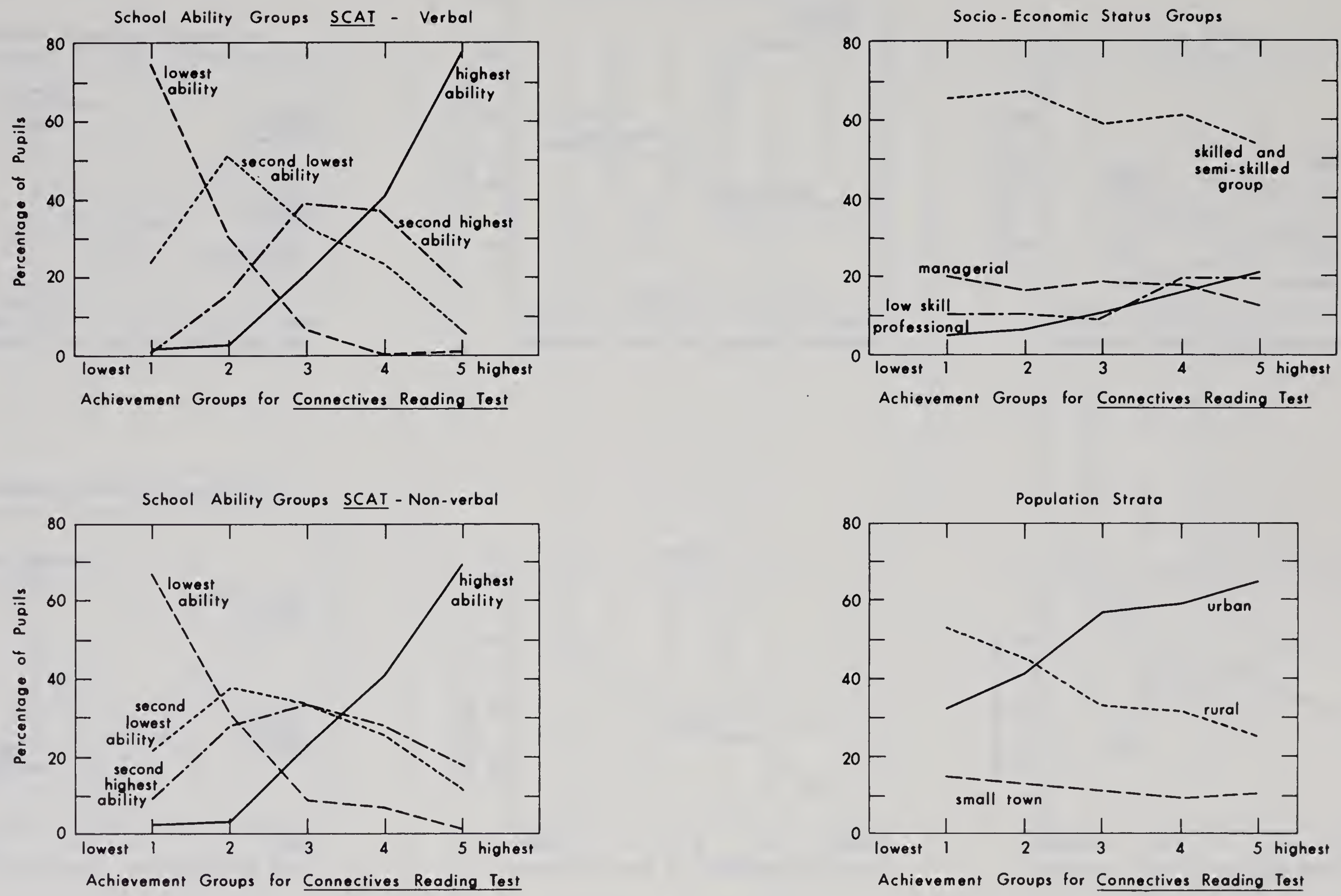

Fig. 8 COMPARISON OF PUPIL PERFORMANCE ON CONNECTIVES READING TEST WITH CERTAIN VARIABLES

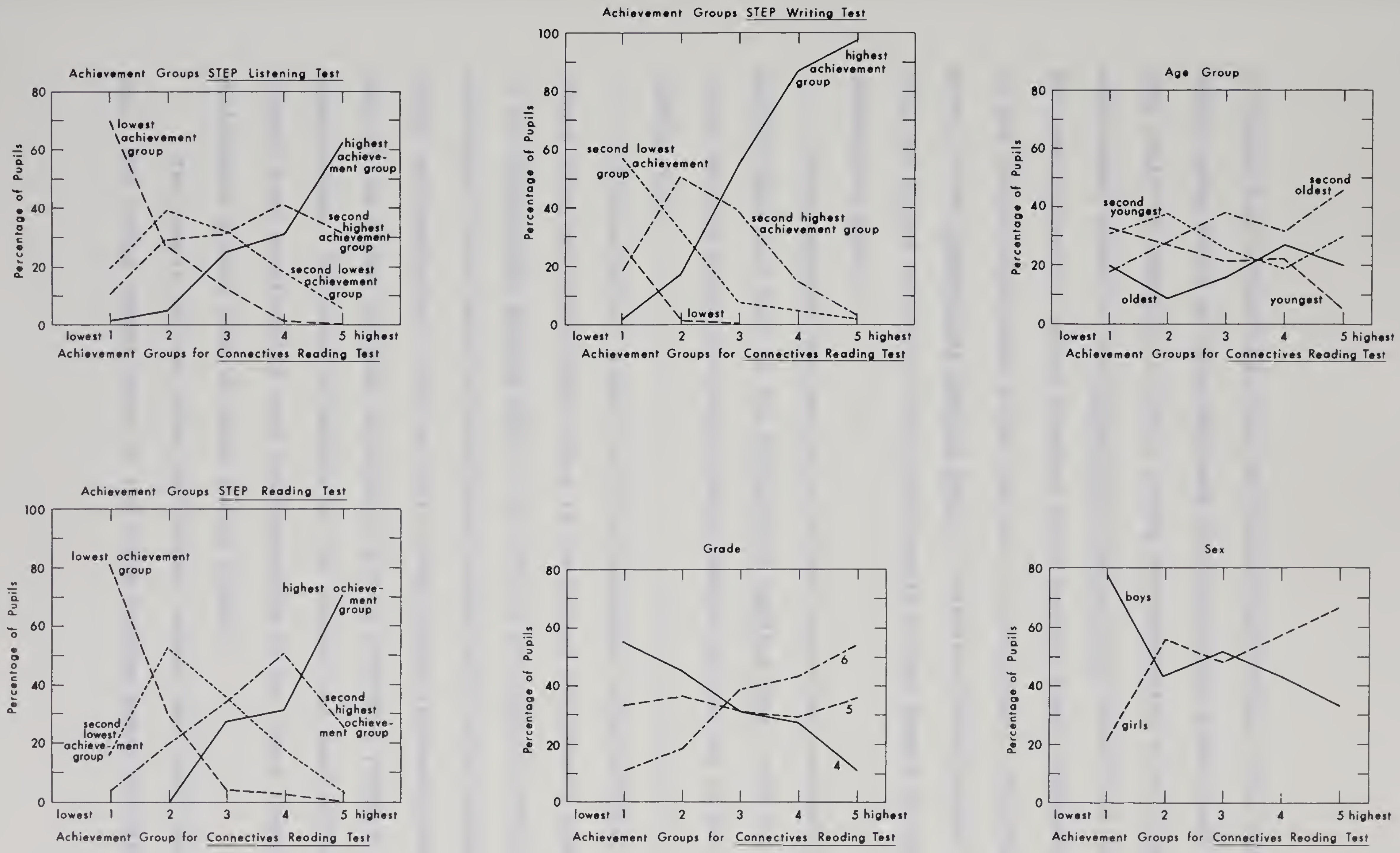

Fig. 9 COMPARISON OF PUPIL PERFORMANCE ON CONNECTIVES READING TEST WITH CERTAIN VARIABLES

in junior high school when they are twelve years of age. The second oldest group would be those who were at their proper grade level and they could be expected to have a strong representation in the highest achievement groups of the Connectives Reading Test, which they did. For some reason the second youngest group had the least representation in the fourth achievement group (the next to the highest achievement group in the Connectives Reading Test). Certainly chronological age does not appear to have a close relationship to the groups of the connectives test.

Those students who were high in both verbal and non-verbal ability were also high on the Connectives Reading Test, with the verbal ability group, the more closely related of the two to the reading test.

Children with a parent in the professional socio-economic status group were found more often in the higher achievement groups of the Connectives Reading Test. The drop in the highest reading achievement group among children whose parents were in the managerial group, was unexpected. The low skill group gained increasing membership in the higher reading achievement groups contrary, perhaps, to expectations. Children of parents in the skilled and semi-skilled groups, have consistently more representation in the lower reading achievement groups than in other status groups.

The graphs for the three population strata were very interesting. The strong upward curve of the urban stratum graph indicated

that the children from the city were well represented in the higher reading achievement groups. The opposite appeared to be true for the rural stratum where the line on the graph had a strong downward trend. School children from the small towns maintained almost a straight graph line indicating an even representation in each one of the reading achievement groups.

The greater percentage of girls in the higher reading achievement groups was pronounced. Although the boys outnumbered the girls in the lowest reading achievement group, the order was reversed in the group having the second lowest achievement scores on the *Connectives Reading Test*.

From these graphs, an accurate summary description of the students in each of the achievement groups of the *Connectives Reading Test* was possible, and has been set out in detail for those in the highest and lowest achievement groups.

The column on the left hand side of the page summarizes the characteristics of students in the lowest achievement group and the column on the right, the highest achievement group. The introductory sentences to the contrasting characteristics have been abbreviated and underlined for quick reference.

1. *Poor Readers*. More than 80 per cent of the group were in the lowest achievement group.

2. *Poor Listeners*. About 70 per cent of the group are those who were members of the lowest achievement group on the *STEP Listening Test*.

3. *Poor in Written Language Knowledge*. More than 75 per cent of the group would be those who were members of the two lowest achievement groups on the *STEP Writing Test*.

4. *Are in a Lower than a Higher Grade*. About 55 per cent of the students would be in grade four and more than 30 per cent, in grade five. Only 10 per cent would be in grade six.

1-3. *Good Readers, Listeners, and Writers*. In all three cases more than 90 per cent of the highest reading achievement group were also members of either the highest or the second highest achievement groups of the *STEP Reading, Writing*, and *Listening Tests*.

4. *Are in a Higher than Lower Grade*. More than 50 per cent would be in grade six, more than 33 per cent in grade five and only 10 per cent in grade four.

5. Slightly Younger than Older. About 60 per cent of them would be aged eight to ten while 40 per cent would be either eleven or twelve years of age.	5. Older than Younger. About 66 per cent of them would be eleven to twelve years of age.
6. Very Low in Verbal Ability. Close to 75 per cent of the students would be in the lowest verbal ability group of the SCAT test, and more than 22 per cent in the second lowest achievement group of the same SCAT test.	6-7. Very High in Both Verbal and Non-Verbal Mental Abilities. The two highest achievement groups in the SCAT test would make up almost 90 per cent of the members of the highest reading achievement group.
7. Low in Non-Verbal Mental Ability. More than 88 per cent of the group will be those who are in the lowest achievement groups of the SCAT test.	
8. Have Parents Who are in All Socio-Economic Status Groups. There was a greater proportionate number of children in the lower reading achievement group whose parents were either in the skilled or in the managerial groups.	8. Have Parents Who Are in All Socio-Economic Status Groups. The children whose parents are in the professional or low skill classes would be better represented proportionately in the highest reading achievement group.

9. <u>More Rural Students</u>. There would be about 20 per cent more rural students than expected and the same per cent less of urban students if the students had membership in the achievement group according to their representation in the student sample. The small town students were slightly in excess of that expected.

9. <u>More Urban Students</u>. About 14 per cent more urban students than would have been expected if these students had had equal representation in each reading achievement group, would be in this highest achievement group. The small town representation would be as expected but the rural percentage would be about 14 per cent less than expected.

10. <u>Predominately Boys</u>. Almost 80 per cent of the group would be boys.

10. <u>Predominately Girls</u>. About 66 per cent of the group would be girls.

IV. AN ORDERING OF THE TWENTY MOST DIFFICULT TEST ITEMS BY GRADE LEVEL

The 150 test items were arranged according to their difficulty indexes so a comparison could be made for the total test group and for each of the grade groups. The items were then grouped according to

difficulty index categories and an analysis of language elements and structures conducted. The findings are the subject of Chapter X. In this section, only the most difficult twenty items will be ordered.

Table XXXI listed the twenty items and by comparison of the four columns, it was noted that in grades four and six, fifteen of the same test items were also listed for the entire test group in the three grades. In grade five, eighteen of the test items mirrored those found to be the most difficult by the entire group tested. In each of the four groups, 75 per cent of the most difficult items were the same.

Although each column lists the twenty test items found to be the hardest by a particular group, the difficulty indexes they represented, varied widely. The range of the indexes for the entire group was from .351 to .502. For grade four, the first item in Table XXXI had an index of .250 and the twentieth item an index of .396. The range in grade five was from .313 to .507, and in grade six, from .403 to .590.

No one connective with the possible exception of "thus" was unduly represented in the columns. In each of grades four to six, grade five, and grade six, fourteen different connectives were represented in items which were designed to test the students' comprehension of them. In the grade four column, eleven different connectives were represented in items designed to test them, and "although" items were represented by a number exceeded only by the

TABLE XXXI

THE TWENTY MOST DIFFICULT TEST ITEMS IN ORDER

Order of Difficulty	Grades 4-6 Test Item	Grade 4 Test Item	Grade 5 Test Item	Grade 6 Test Item
1.	although (73)**	*thus-who (138)	*that (simple incl.) although (131)	*although (73)
2.	thus (102)	*thus (87)	*where (142)	*where (142)
3.	***thus-who (138)	*thus (102)	*although (73)	*thus (102)
4.	where (142)	*who (58)	*thus-who (138)	*that (simple incl.) although (131)
5.	that (simple incl.) -although (131)	*although (73)	*thus (102)	*thus-who (138)
6.	thus (87)	*yet-and (3)	*thus (87)	*"absent" (48)
7.	but, if (75)	*because (74)	*if-however (37)	*thus (87)
8	because (74)	*for-and (103)	*when (97)	*but, if (75)
9.	for-and (103)	*where (142)	*because (63)	*if-which (57)
10.	who (58)	thus-who (113)	*but, if (75)	*when (97)
11.	when (97)	*if-which (57)	*but-which (86)	*and-who (7)
12.	"absent" (48)	*that (simple incl.) although (131)	*for-and (103)	*because (74)
13.	if-which (57)	*if (91)	*who (58)	but-which (130)
14.	if (91)	*however (49)	*and-who (7)	*if-however (37)
15.	if-however (37)	however, for (11)	*if (91)	so (106)
16.	and-who (7)	although (71)	*however (49)	*yet-and (3)
17.	because (63)	although-that (simple incl.) (121)	*because (74)	"absent"-that (simple incl.) (67)
18.	however (49)	thus (39)	thus-who (69)	yet (17)
19.	yet-and (3)	*but, if (75)	"absent"-that (67)	"absent" (31)
20.	but-which (86)	*"absent" (48)	*"absent" (48)	*if (91)

* The test items with this mark are also found in the Grades 4-6 column.

** The numbers in the brackets correspond to the test item numbers on the Connectives Reading Test.

*** The underlined connective is the one for which that particular test item was designed.

"thus" items. It appeared that whatever the elements of difficulty were in the test items at any grade level, they were common to the majority of the items, regardless of the particular connective for the most part.

SUMMARY

The four main sections of this chapter compared the reliability of the Connectives Reading Test, reported on student achievement on the test, offered a description of the students who composed the five achievement groups based on total test scores, and set out the twenty most difficult test items at each grade level.

A comparison of the Kuder-Richardson formula 20s for both the pilot study and the main investigation showed high reliability coefficients throughout. The test variance was large indicating a wide range of test scores.

The students comprehended only about two-thirds of what they read on the Connectives Reading Test, with the grade four students understanding slightly more than one-half of what they read, and the grade six young people, about three-quarters.

For the test items grouped according to connective class and by individual connective, a strong developmental learning trend was evident. That is, the level of comprehension for any connective group of test items was almost always lowest for grade four, higher for grade five and highest for grade six. The particular level of

understanding varied greatly from one connective group of test items to another, as did the rate of development of understanding.

There was no consistent pattern of difficulty established between single connective and multi-connective test items.

In an analysis of the errors of students a clear pattern emerged. The most frequent type of error was grammatical, closely followed by that of the wrong connectives. Situational errors were made much less frequently.

Five reading achievement groups were identified within the total student group and within each grade group. The same developmental trend was apparent <u>within</u> each of these five reading achievement groups as was noted generally for the total test group and the grade groups. That is, not only were there five distinct achievement level groups but the achievement within any one of the five groups followed the developmental trends noted for groups as a whole. For example, the trend in which the top achievement group in grade four tallied a lower score than the one in grade five, which in turn was lower than the top group in grade six, was noted for the grade groups in their total test scores, in the scores on items representing connective classes and again in the test scores on items which represented a particular connective.

The students who composed each of the five achievement groups were found to have clear cut attachments to tests of the language

arts and of mental ability. Students who scored high on the Connectives Reading Test also scored high on STEP and SCAT tests. Girls generally did better than boys and those in higher grades than those in lower. Only among the groups of chronological age and socio-economic status did no close association appear.

When the twenty most difficult test items were ordered, 75 per cent of them were common to the total test group, and to the student groups at each grade level.

CHAPTER VII

FINDINGS: THE COMPUTATION OF CORRELATIONS

A number of correlations were determined to ascertain the relationships existing between the Connectives Reading Test, the seventeen connective groups in it, and other variables. This chapter will report these calculations in four sections:

1. The correlation of the Connectives Reading Test total scores with each of the seventeen connective group test scores including inter-correlations among the seventeen connective groups.

2. The correlations of the Connectives Reading Test with each of the seventeen connective groups by grade and sex, the inter-correlations among the seventeen connective groups, and the testing of the significance of the relationships.

3. The correlations of STEP, Listening, Reading, and Writing, SCAT, and other variables, with the Connectives Reading Test.

4. The stepwise multiple regression analysis for the identification of the covariants which would best predict total scores on the Connectives Reading Test.

I. CORRELATION OF CONNECTIVES READING TEST TOTAL SCORES WITH EACH OF SEVENTEEN CONNECTIVE GROUP SCORES

The connective analyses indicated that the seventeen connective groups had a high positive relationship to the Connectives

Reading Test as a whole. To determine whether this relationship actually existed, correlations were computed between the students' total test scores and their scores on each of the seventeen subtests. Table XXXII gives the results. The correlations with the STEP Reading Test are also given for comparison.

Each of the seventeen connective groupings has a high positive correlation with the Connectives Reading Test as a whole. According to Ferguson[1] the square of the correlation coefficient when multiplied by 100 will give a more accurate measure of the degree of relationship actually existing. For "that" (relative pronoun) which has the highest correlation, 78.15 per cent of the total score test variance would be predicted from the variance of the "that" items. The lowest correlation, "thus," would only predict 35.64 per cent of the total test variance. It is interesting to note that "that" (simple includer) has the second lowest correlation and would only predict 55.30 per cent of the total test variance. As a connective group, the subordinate clause simple includers have the highest over-all set of correlations, with the sentence linkers, the lowest set. Certainly, from these correlations it could be expected that from a student's score on any one of the connective groupings with the possible exception of the "thus" group, the student's score on the entire test could be predicted with a moderate degree of accuracy.

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[1] George A. Ferguson, Statistical Analysis in Psychology and Education (Toronto: McGraw-Hill Book Company, Inc., 1959), pp. 107-108.

TABLE XXXII

CORRELATIONS BETWEEN TOTAL SCORES ON CONNECTIVES READING TEST AND THE SEVENTEEN CONNECTIVE GROUP SCORES (N = 402)

Correlation of Student Scores on Items Testing the Connective: with:	Connectives Reading Test Total Scores Correlation	Connectives Reading Test Rank Order	STEP Reading Test Total Scores Correlation	STEP Reading Test Rank Order
"although"	0.852	3	0.728	4
"because"	0.822	7	0.685	7
"if"	0.817	9	0.718	5
"so"	0.835	4	0.753	2
"that"-simple includer	0.744	16	0.608	16
"when"	0.827	5	0.689	6
"where"	0.863	2	0.757	1
"that"-relative pronoun	0.884	1	0.743	3
"which"	0.812	11	0.656	10
"who"	0.808	13	0.646	14
"and"	0.804	14	0.647	13
"but"	0.822	7	0.684	8
"for"	0.813	10	0.653	12
"yet"	0.827	5	0.673	9
"absent"	0.812	11	0.656	10
"however"	0.760	15	0.637	15
"thus"	0.597	17	0.499	17
All Connectives	1.00		0.834	

The correlations of each of the seventeen connective groupings with the STEP Test revealed high positive relationships also but they were not as high as those reported above. The two sets of correlations were ranked and then compared, and it was found that with the exception of the correlations with "if" and "yet," no discrepancies of more than 1 - 2 ranks were set out. This would confirm the report in Table XXXII that the correlation of the STEP Reading Test with the Connectives Reading Test is a high positive one.

In the same manner, correlations were determined for the seventeen connective groupings with each other. Here too, the same high positive relationship existed with the inter-correlations of "that" (relative pronoun) the highest, and "thus," the lowest. All correlations were significant at the 0.01 level for a two-tailed test. The results are reported in full in Appendix E.

II. CORRELATIONS OF THE CONNECTIVES READING TEST WITH THE SEVENTEEN SUBTESTS, AND THE SIGNIFICANCE OF THE CORRELATIONS

To further investigate these relationships, correlation coefficients between the connective groupings and the total test by sex and grade were computed using standard scores with correlated "t" tests to test their significance.[2] The results are reported in full in Appendix F with Table XXXIII giving only the significant correlations.

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[2] Ibid., pp. 90, 154-155.

TABLE XXXIII

SIGNIFICANT CORRELATIONS BETWEEN TOTAL SCORES AND THE SEVENTEEN CONNECTIVE GROUP SCORES ON THE CONNECTIVES READING TEST BY GRADE AND SEX (N = 67)

Grade	Sex	Connective Group	Correlation Between Total Test Scores and Conn. Grouping	df	Correlated "t" Test Value	Significance.
4	boys	"because"	0.785	66	2.968	**
		"when"	0.781	66	2.365	*
		"where"	0.863	66	2.543	*
		"that"-relative pronoun	0.856	66	2.404	*
		"which"	0.809	66	2.419	*
		"and"	0.716	66	2.510	*
		"but"	0.818	66	4.035	**
		"yet"	0.797	66	2.034	*
		"however"	0.616	66	2.105	*
	girls	"but"	0.855	66	2.922	**
		"absent"	0.826	66	2.364	*
5	boys	"but"	0.807	66	2.084	*
		"thus"	0.573	66	2.246	*
	girls	"when"	0.793	66	2.171	*
		"where"	0.824	66	3.641	**
		"thus"	0.492	66	2.387	*
6	boys	"that"-relative pronoun	0.875	66	2.046	*
		"but"	0.783	66	2.746	**
	girls	"if"	0.752	66	3.464	**
		"so"	0.742	66	2.550	*
		"when"	0.787	66	2.185	*
		"where"	0.848	66	2.733	**
		"and"	0.761	66	3.272	**
		"for"	0.674	66	2.205	*

* - $p < .05$ for a two-tailed test

** - $p < .01$ for a two-tailed test

[illegible]

Of the twenty-four correlations reported there, one-third of them were significantly different at the 0.01 level for a two-tailed test. The largest concentration of differences was found with the grade four boys and grade six girls.

For each of the connective types it appeared that functional relationships exist with special reference to both grade and sex. It is difficult to interpret what this means but it may be that although sex and grade do not cause these differences, they were an important part of the particular student environment at the time when these differences were noted.

The scattergram in Table XXXIV gives more information regarding the connectives classes and the correlations. Of the twenty-four correlations, nine were simple includers and eight were co-ordinate connectives. The highest frequency was contributed by the connective "but," the only connective in which there were significant correlations for boys in each of the three grades. No connective had significant correlations for the girls at each grade level.

The correlations which existed between one connective grouping and another were also tested to find out if any two of the groups differed significantly as predictors of student scores on the total test. Table XXXV sets out each of the significant correlations and indicates their level of significance.

A comparison of this table with Table XXXIII showed that the connective groups which were significantly different from the total

TABLE XXXIV

SCATTERGRAM OF SIGNIFICANT CORRELATIONS BETWEEN TOTAL SCORES AND THE SEVENTEEN CONNECTIVE GROUP SCORES ON THE CONNECTIVES READING TEST BY GRADE AND SEX (N = 67)

Type of Connective	Connective	Grade and Sex: 4 boys	4 girls	5 boys	5 girls	6 boys	6 girls	Totals boys	Totals girls
Subordinate clause conn. - simple includer	because	**						1	
	if						**		1
	so						*		1
	when	*			*		*	1	2
	where	*			**		**	1	2
		3			2		4	= 3	6
Subordinate clause conn. - relative pronoun	that	*				*		2	
	which	*						1	
		2				1		= 3	
Co-ordinate clause connective	and	*					**	1	1
	but	**	**	*		**		3	1
	for						*		1
	yet	*						1	
		3	1	1		1	2	= 5	3
	"absent"		*						1
			1					=	1
Sentence linkers	however	*						1	
	thus			*	*			1	1
		1		1	1			= 2	1
	Totals	9	2	2	3	2	6	13	11
		= 11	= 11	= 5	= 5	= 8	= 8	= 24	= 24

* - significant at the 0.05 level for a two-tailed test.
** - significant at the 0.01 level for a two-tailed test.

TABLE XXXV

INTERCORRELATIONS AMONG SEVENTEEN CONNECTIVE GROUPS BY GRADE AND SEX (N = 67)

Grade	Sex	Correlation of:	With:	Correlation Coefficient	df	Correlated "t" Test Value	Significance
4	boys	although	because	0.629	66	2.107	*
		although	but	0.601	66	2.596	**
		so	but	0.699	66	2.061	*
		that (simple incl.)	but	0.540	66	2.523	*
		that (simple incl.)	and	0.555	66	2.009	*
	girls	if	thus	0.296	66	2.020	*
		so	thus	0.139	66	2.089	*
		that (simple incl.)	thus	0.319	66	2.640	**
		that (simple incl.)	which	0.497	66	2.460	*
		that (rel. pro.)	but	0.699	66	2.282	**
		which	but	0.592	66	2.837	**
		who	but	0.650	66	2.057	*
		thus	but	0.274	66	2.647	**
		which	so	0.516	66	2.183	*
		which	and	0.491	66	2.151	*
		thus	and	0.206	66	2.223	*
		which	"absent"	0.428	66	2.223	*
		however	"absent"	0.637	66	2.143	*
		thus	"absent"	0.266	66	2.470	*
		thus	for	0.278	66	2.085	*

* - significant at the 0.05 level for a two-tailed test
** - significant at the 0.01 level for a two-tailed test

TABLE XXXV (continued)

Grade	Sex	Correlation of:	With:	Correlation Coefficient	df	Correlated "t" Test Value	Significance
5	boys	although	but	0.776	66	2.225	*
		although	thus	0.583	66	2.056	*
		if	but	0.667	66	2.269	*
		so	but	0.678	66	2.010	*
		that (simple incl.)	thus	0.598	66	2.305	*
		when	thus	0.564	66	2.022	*
		where	but	0.694	66	2.517	*
		that (rel. pro.)	but	0.647	66	2.041	*
		who	but	0.700	66	2.837	**
		yet	but	0.713	66	2.029	*
		however	but	0.593	66	2.136	*
		and	thus	0.519	66	2.585	**
		for	thus	0.516	66	2.007	*
		"absent"	thus	0.429	66	2.063	*
	girls	if	where	0.610	66	2.323	*
		if	thus	0.458	66	2.224	*
		so	where	0.621	66	2.337	*
		so	thus	0.417	66	2.128	*
		that (simple incl.)	when	0.618	66	2.045	*
		that (simple incl.)	where	0.646	66	3.134	**
		that (simple incl.)	thus	0.352	66	2.483	*
		but	where	0.611	66	2.109	*
		"absent"	where	0.766	66	3.301	**
		that (rel. pro.)	where	0.610	66	2.069	*
		"absent"	thus	0.267	66	2.084	*
6	boys	although	but	0.677	66	2.522	*
		which	but	0.619	66	2.527	*
		who	but	0.489	66	2.010	*
		however	but	0.593	66	2.042	*
		thus	but	0.464	66	2.545	*
	girls	although	and	0.706	66	2.114	*
		that (rel. pro.)	if	0.598	66	2.219	*
		that (rel. pro.)	and	0.613	66	2.218	*
		which	and	0.669	66	2.686	**
		which	if	0.490	66	2.207	*

test scores were also those which now showed a significant difference with other connective groupings. For example, in the grade five girls' group, the correlations between the connective groups of "when," "where," and "thus" and the total test scores were all significantly different, and now the connectives of "where" and "thus" are those which showed significant differences with an assortment of other connectives. That is, as predictors of total test scores the connective groups do differ significantly when students are grouped by sex and grade.

III. THE CORRELATION OF STEP AND SCAT TESTS AND OTHER VARIABLES WITH THE CONNECTIVES READING TEST

Correlations of the STEP and SCAT tests with the total scores of the Connectives Reading Test (Table XXXVI) showed a high positive relationship. The strongest relationship was with the STEP Writing Test (0.857) and the weakest in this group was with the STEP Listening Test (0.715). Using Fergusons' approach[3] to a more accurate measure of the degree of relationship actually existing, a correlation of 0.857 indicated that the STEP Writing Test would predict about 73 per cent of the variance of the total test scores, while the STEP Listening Test would predict about 51 per cent of the variance.

Of the remaining four variables, sex and grade alone were significant at the 95 per cent confidence level but they would predict

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[3] *Ibid.*, pp. 107-108.

TABLE XXXVI

CORRELATIONS BETWEEN CERTAIN VARIABLES AND THE CONNECTIVES READING TEST (N = 402)

Correlation Between Connectives Reading Test and:	Correlation	Significance of Correlation
STEP Reading Test	0.834	**
STEP Writing Test	0.857	**
STEP Listening Test	0.715	**
SCAT Test - Verbal Section	0.833	**
SCAT Test - Non-Verbal Section	0.729	**
SCAT Total Test	0.840	**
Sex	0.258	**
Grade	0.383	**
Chronological Age	0.164	ns
Socio-Economic Status	0.186	ns

** - significant at the 0.01 level for a two-tailed test.

ns - not significant at the 0.05 level for a two-tailed test.

much smaller amounts of the variance of the total test scores. Sex would predict about 7 per cent of the variance and grade level about twice that per cent. Neither chronological age nor socio-economic status registered a significant correlation, so apparently there is little capacity in either of them to predict the students' scores on the Connectives Reading Test.

Further investigation in this chapter will confirm that the students' chronological ages do not appear to be a function of their ability to read the test items of the connectives test well. As children advance grade by grade, the span between the extreme ends of the reading achievement levels of the students widens. In grades four to six, the youngest and oldest are found in the lowest and highest achievement groups in smaller numbers because they are more immature mentally than their peers.

Although socio-economic status has in the past been a variable known to have affected the outcome of an experiment, the mobility of people and the ease with which reading material can be obtained, has helped to nullify the differences which formerly existed between occupational status groups. Apparently now no matter what a child's father works at, his job does not affect beyond a chance level, his child's ability to read connectives well.

IV. STEPWISE MULTIPLE REGRESSION ANALYSIS

Knowing that all but two of the variables had a functional relationship to the Connectives Reading Test, an analysis was carried

out to find out which of them would constitute the best set of variables to predict the greatest variance of the Connectives Reading Test.

The correlation coefficients noted above served as a guide to order the addition of the variables step by step, beginning with the STEP Writing Test, the variable most closely correlated with the Connectives Reading Test. At each step in the analysis, an additional variable was added to the regression equation and its variance added to the regression sums of squares. The resulting variance reduction in the error sums of squares was assessed at the 99 per cent level of confidence for "F." The "F" was then tested for the statistical significance of the linear regression on the variable which was being added to the regression equation at that step. If the "F" was significant, then the variance contribution of the last variable added in the regression was accepted in the regression equation and the variance was added to the regression sums of squares.[4]

Table XXXVII analyzed the variance composed of the regression upon each of the variables as they were added singly, of the error sums of squares, and of the total sums of squares. The latter remained constant and as the regression of each of the variables was

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[4]M. A. Efroymson, "Multiple Regression Analysis," Mathematical Methods for Digital Computers, eds. A. Ralston and H. S. Wilf (New York: John Wiley & Sons, Inc., 1960), p. 191.

TABLE XXXVII

ANALYSIS OF VARIANCE IN STEPWISE REGRESSION ANALYSIS

Step No.	Sources of Variance (Sums of Squares) Regression on Variables #:	Regression SSQ	Error SSQ	Total SSQ	Mean Square	df	F
Step #1	1	261747.69			261747.69	1	1110.58
			94273.749		235.68	400	
				356020.44		401	
Step #2	1 & 2	289088.01			144544.00	2	861.66
			66932.429		167.75	399	
				356020.44		401	
Step #3	1, 2 & 3	294726.01			98242.00	3	637.91
			61294.425		154.01	398	
				356020.44		401	
Step #4	1, 2, 3 & 4	295650.59			73912.65	4	486.06
			60369.843		152.07	397	
				356020.44		401	
Step #5	1, 2, 3, 4, 5	296059.16			59211.83	5	391.05
			59961.273		151.42	396	
				356020.44		401	
Step #6	1, 2, 3, 4, 5, 6	296127.79			49354.63	6	325.50
			59892.644		151.63	395	
				356020.44		401	
Step #7	1, 2, 3, 4, 5, 6 & 7	296138.12			42305.45	7	278.35
			59882.312		151.99	394	
				356020.44		401	

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE XXXVIII

CALCULATIONS IN STEPWISE REGRESSION ANALYSIS

Step No.	Source of Variance Added	F Ratio (from Table XXXVII)	"t" Test Value	Significance of Variance Added	Per Cent Variance Predicted	Total Variance (K^2) Predicted
Step #1	STEP Writing Test	1110.58		**	73.52	73.52
Step #2	SCAT-Verbal Section of Test	861.66	162.99	**	7.68	81.20
Step #3	STEP Reading Test	637.91	36.61	**	1.58	82.78
Step #4	SCAT-Non-verbal Section of Test	486.06	6.08	**	0.26	83.04
Step #5	STEP Listening Test	391.05	2.70	**	0.11	83.16
Step #6	Chronological Age	325.50	0.45	ns	0.02	83.18
Step #7	Socio-Economic Status	278.35	0.07	ns	0.00	83.18

** - significant at 0.01 level for a two-tailed test.

ns - not significant at the 0.05 level for a two-tailed test.

added to the regression sums of squares, the error sums of squares was reduced. The variance ratios ("Fs") are all large as would be expected when variance is added each step. The significance of the variance added at each step is the important calculation and is given by the "t" values in Table XXXVIII. The five tests, three STEP and two SCAT, all predicted significant amounts of the variance of total scores of the Connectives Reading Test. With the addition of the chronological age variable, the variance of it and the one following it (socio-economic status) contributed negligibly to the variance of total test scores over and above what had already been contributed. The effects of both variables were non-significant. It was noted that the six variables together contributed a total of 83.18 per cent of the total variance of the test scores.

Null hypothesis 1 which stated that there is no significant relationship between the understanding a child has of connectives and sex, mental age, chronological age, socio-economic status, listening ability, reading ability, and written language ability, is untenable for each of the variables except chronological age and socio-economic status. There is a significant relationship between a child's understanding of connectives in reading and the factors of sex, mental age (both verbal and non-verbal) and of ability in listening, reading, and written language.

The choice of factors with the exception of chronological age and socio-economic status appears to have been warranted. However,

[illegible]

[illegible]

[illegible]

both of these factors had been important variables in previous studies and it may be that changing conditions in the schools have contributed to their ineffectiveness in this study.

The improved methods of teaching reading have afforded our students greater opportunities to learn to read better. This fact coupled with the effects of streaming practices in schools, have concentrated more children at any particular grade level by merit of mental achievements and capacities than by chronological age. The effects of chronological age therefore, have to a degree, been nullified.

With the organization of small town and rural areas into larger administrative areas in education, better schools with their facilities and teaching staffs have been available to these children. This has helped to offset the effects formerly felt when the families in the higher socio-economic stratas who lived often in urban areas, were almost certain to have better educational facilities for their children.

With the advent of pocket books and expanding libraries, many more children have easier access to the printed page regardless of socio-economic status. However, it cannot be overlooked that in Canada the Occupational Class Scale is not adequate to describe the great diversity of occupations of both fathers and mothers in this technological age. Had the Scale more adequately differentiated the

occupations of fathers of the children, this factor may have had more effect on the total test scores of the Connectives Reading Test.

SUMMARY

Through the computation of correlation coefficients it was found that the test scores representing the items of the sixteen connective groups correlated highly with the total test scores of the Connectives Reading Test. The group of test items for the connective "thus" was the exception. Similarly, these same test scores for the sixteen connective groups ("thus" was an exception again) correlated almost as highly with the STEP Reading Test total scores, confirming that the correlation between the scores of the Connectives Reading Test and the STEP Reading Test was high.

The intercorrelations of the seventeen connective groupings were all high, significant at the 0.01 level for a two-tailed test.

A further investigation by sex and grade of the correlation coefficients between connective groupings and total test scores showed that one-third of the correlations were significantly different, with the largest concentration of differences found with the grade four boys and the grade six girls. This means that both sex and grade were important ingredients of the student environment for the reading comprehension of connectives.

When the coefficients between connective groupings were set out in tables, it was evident that the scores for particular connectives

which showed significant differences from the total test scores, now showed significant differences with other connective groupings.

The STEP Listening, Reading, and Writing Tests and the two SCAT Tests (verbal and non-verbal sections) correlated highly with the Connectives Reading Test, with sex and grade showing significant but less high correlations. Neither chronological age nor socio-economic status registered significant correlations with the connectives test.

The stepwise multiple regression analysis showed that the three STEP Tests, the two SCAT Tests, and chronological age predicted 83.18 per cent of the total variance in the Connectives Reading Test, with the last named variable adding a non-significant amount.

CHAPTER VIII

FINDINGS: THE ANALYSES OF VARIANCE, COVARIANCE, AND FACTOR ANALYSIS

The tests of the significance of students' performance on the Connectives Reading Test by analyses of variance and covariance are reported in this chapter together with a principal-axis factor analysis. The chapter has seven sections.

1. One-way analyses of variance by grade on the total student scores of the Connectives Reading Test and on the scores of each of the seventeen connective groups of test items will be reported first. Each student group was divided into five groups according to their achievement on the Connectives Reading Test and a Newman-Keuls comparison between the means of the groups was completed.

2. A further analysis of variance by grade and sex on the Connectives Reading Test score will be recorded next. A three factor experiment with a repeated measure on the third factor (the Connectives Reading Test scores), the first measure was the students' standard scores on each of the seventeen connective test item groupings. The second measure was the total standard scores of the students on the test.

3. The third report will be a three-way analysis of variance by grade, sex, and population strata on total scores of the Connectives Reading Test.

4. Two-way analyses of variance by sex and population strata on total scores of the Connectives Reading Test by grade will complete the variance analyses.

5. A two-way analysis of covariance by sex and population strata with five covariants on the total test scores of the Connectives Reading Test by grade, is the first of two covariance analyses. The five covariants are the variables represented by student test scores on the STEP Listening, Reading, and Writing Tests and the SCAT verbal and non-verbal tests.

6. A three-way analysis of covariance by grade, sex, and population strata with five covariants on the total scores of the Connectives Reading Test, will precede the factor analysis.

7. A principal-axis factor analysis on the Connectives Reading Test will be the last report of the chapter.

I. ONE-WAY ANALYSES OF VARIANCE

To find out if the grade levels had any real effect on the variance of the Connectives Reading Test scores, a one-way analysis of variance was carried out. In addition to using the total test scores, the 150 test items were grouped into seventeen groups, one for each of the seventeen connectives being tested. The students who took the test made up five groups according to their achievement on the test. For each connective group, then, as well as for the total test scores, an analysis was completed to find out if the

variance among the means of the five achievement groups around the grand mean of the groups, differed significantly from the variance within each of the five achievement groups. Table XXXIX summarized the results for the total test group. Additional tables for each grade are given in Appendix G. By a "scores grouping" in the tables is meant the gathering together of all of the test items which were designed to test a particular connective. For example, all the student scores on the test items which tested the connective "although" constituted the grouping for that particular analysis of variance.

The variance ratios for each of the seventeen connective groupings and for the total scores groups were highly significant with a probability of $p < .001$. It appeared that for each student test group, a factor was affecting the test scores significantly. As a connective was common to each test item, it also followed that this linguistic element could be a portion of that factor.

In Table XXIV, page 159, the summary of the students' answers on the Connectives Reading Test by grade, it was shown that the students developed in their understanding of connectives from grade to grade. Null hypothesis 2 which states that there is no significant increase in the pupils' understanding of connectives from grade four to five, to six, cannot be upheld. There is a significant increase from grade to grade in the students' understanding of connectives.

TABLE XXXIX

SUMMARY OF ANALYSIS OF VARIANCE - GRADES FOUR TO SIX

Scores Grouping Test Items	Source of Variance and Sums of Squares		Mean Squares		df		F*
	Among means ach. groups	Within ach. groups	Among means ach. groups	Within ach. groups	Among means ach. groups	Within ach. groups	
"although	2032.4392	693.5135	508.11	1.75	4	397	290.87
"because	1332.9409	844.1538	333.24	2.13	4	397	156.72
"if"	1077.6959	659.8489	269.42	1.66	4	397	172.10
"so"	1309.5032	651.6611	327.38	1.64	4	397	199.44
"that"(simple Inc.)	389.3434	318.8556	97.34	0.80	4	397	121.19
"when"	1384.3777	727.6124	346.09	1.83	4	397	188.84
"where"	1720.8330	678.9185	430.21	1.71	4	397	251.57
"that"(rel.pro.)	2631.6404	915.2378	657.91	2.31	4	397	285.38
"which"	1172.9739	559.6058	293.24	1.41	4	397	208.04
"who"	1024.6014	582.1672	256.15	1.47	4	397	174.68
"and"	1348.4509	817.1511	337.11	2.06	4	397	163.78
"but"	1452.7102	782.9739	363.18	1.97	4	397	184.15
"for"	1047.6661	550.4658	261.92	1.39	4	397	188.90
"yet"	1058.6528	559.3672	264.66	1.41	4	397	187.84
"absent"	1034.6969	591.9226	258.67	1.49	4	397	173.49
"however"	924.3098	712.9639	231.08	1.80	4	397	128.67
"thus"	387.8586	546.1315	96.96	1.38	4	397	70.49
Total Scores (All Test Items)	329,046.15	27,099.937	82,261.54	68.26	4	397	1,205.09

* For each F in this table, the $p < .001$

Table XXIV also showed that as the percentage of correct answers increased, there was a corresponding decrease in the percentage of wrong connective answers and a drop also in the percentage of grammatical and situational errors. Now in the one-way analysis of variance it has been shown that there are significant differences between the students' achievement scores (i.e. his selection of the correct answers) at each of the three grade levels. Therefore, null hypothesis 5 which states that there is no significant difference between the child's understanding of connectives, his choice of answers on the reading test which is the research instrument, and the variables, is untenable. There is a significant difference.

The item analyses showed that among the seventeen connectives, there were different percentages of correct answers. Also, the sums of squares for each connective, grade by grade, varied one from the other proving that there is a real difference between the test scores of the connective groupings and the total test scores at each grade level. There is, then, a lack of uniformity in the rate of development of understanding among the different connectives. Null hypothesis 3 which stated that there is no significant difference in the rate of development of the students' understanding of different connectives cannot be upheld.

Because of the significant variance ratios, a Newman-Keuls comparison[1] was employed to find out which of the five means in a

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[1]B. J. Winer, Statistical Principles in Experimental Design (Toronto: McGraw-Hill Book Company, Inc., 1962), pp. 80-85, 101-104.

particular group was different from the other. A summary of the results of this comparison was given in Table XL and the figures from which the table was compiled are in Appendix D. With five achievement groups there would be ten pairs of means on which to test differences.

In the total group tested (grades four to six achievement groups) there were only seven means which were not significantly different one from the other. From a possible 180 pairs of means (ten pairings of means in eighteen groups) this figure of seven represented only a small portion, 3.89 per cent. All but one of these seven mean differences were between the two highest achievement groups (groups 5 and 4) and they were associated with the connectives which the students found easier to comprehend in the test items. Four of the five connective groups (sentence linkers, etc.) were represented in the seven mean differences precluding any thought of concentration in one connective group. Of the remaining differences between the means of the achievement groups, all but three were highly significant one from the other. In the total group tested, then, there are at least five achievement levels in which 173 pairs of means showed the real effect of a factor at work other than chance. The differences reported in the preceding section of this chapter as percentages of correct answers from one achievement group to another were almost all real differences.

TABLE XL

NEWMAN-KEULS COMPARISON BETWEEN ORDERED MEANS

Grouping of Scores by Connectives	ACHIEVEMENT GROUPS: Grades 4 - 6 (5 4 3 2 1)	Grade 4 (5 4 3 2 1)	Grade 5 (5 4 3 2 1)	Grade 6 (5 4 3 2 1)
"although"		x	x	ns ns
"because"		ns ns	ns x x	ns ns ns ns x
"if"		ns	x ns ns	ns ns ns x
"so"	ns	ns ns	x ns ns	ns ns ns ns ns x
"that" (simple includer)	ns	ns ns x	ns ns	ns ns ns ns ns x
"when"		x ns	ns x	ns ns ns x
"where"	x	ns	ns ns ns	ns ns ns x x
"that" (relative pronoun)			ns	x ns
"which"	ns	ns x x	ns ns	ns ns ns ns

" ns " the two means connected by a line are not significantly different at the 0.05 level of significance.

" x " the two means connected by a line are different at the 0.05 level of significance.

All of the groups with no markings were different from each other at the 0.01 level of significance.

TABLE XL (continued)

Grouping of Scores by Connectives	ACHIEVEMENT GROUPS: Grades 4 - 6 (5, 4, 3, 2, 1)	Grade 4 (5, 4, 3, 2, 1)	Grade 5 (5, 4, 3, 2, 1)	Grade 6 (5, 4, 3, 2, 1)
"who"	5–4: ns	4–3: x; 2–1: x		5–4: ns; 4–3: ns; 3–2: x; 5–3: ns
"and"		5–4: x; 4–3: x; 3–2: ns	5–4: x; 3–2: x	5–4: ns; 4–3: x; 3–2: ns
"but"			5–4: ns; 4–3: ns	5–4: ns; 4–3: ns; 3–2: ns; 4–2: x
"for"	5–4: ns	5–4: x; 3–2: ns	5–4: x; 4–3: ns	5–4: ns; 4–3: ns; 2–1: x; 5–3: ns
"yet"	5–4: ns	4–3: x	5–4: ns; 4–3: ns	5–4: ns; 4–3: ns; 3–2: ns; 5–3: ns; 4–2: ns; 5–2: x
"absent"	5–4: ns	5–4: ns; 4–3: ns	5–4: ns; 3–2: ns	5–4: ns; 4–3: ns; 5–3: ns
"however"		5–4: ns; 3–2: ns; 2–1: ns; 3–1: x	5–4: ns; 3–2: ns	5–4: ns; 4–3: ns; 3–2: ns
"thus"	3–2: x; 2–1: x	5–4: ns; 4–3: ns; 3–2: ns; 2–1: ns; 5–3: x; 3–1: ns; 4–2: ns; 4–1: x	5–4: x; 4–3: ns; 3–2: ns; 2–1: ns; 3–1: x	5–4: ns; 3–2: ns; 2–1: x
Total				4–3: x

Null hypothesis 4 that stated that there is no significant variation in the students' understanding of a connective at one grade level, cannot be upheld. There are at least five achievement levels in which there are significant variations in the students' understanding of the connectives. For the total student group across the three grades almost all five groups were significantly different one from the other. Singly, at each of the grade four, five and six grade levels, there were fewer significant differences although they still far outnumbered the non-significant differences (see Table XL).

Table XLI tallied the significant differences between the means and indicated some interesting progressions from one grade level to another. The number of times any two means of the achievement groups were significantly different from each other, dropped from grade four to five to six with the greater drop coming between the two higher grades. Apparently, as the students increased in their ability to read with understanding, this developing skill was reflected in fewer significant differences between the means of their respective achievement groups. It is noted that unless a grade by grade study by individual connective groups had been conducted, these developmental levels may not have been identified, as they were not apparent from the over-all scores.

In addition, the means for groups three and four were more often involved in non-significant differences than were the means

TABLE XLI

TALLY OF MEANS (SIGNIFICANT AND NON-SIGNIFICANT) BY GRADE

Grade	No. of Times Two Means of Achievement Groups Were Significantly Different From Each Other	No. of Times Two Means of Achievement Groups Were Not Significantly Different From Each Other						
		Means in Achievement Groups:					Total No. Means	Total No. Pairs of Means
		5	4	3	2	1		
4 - 6	173	6	7	1	0	0	14	7
4	157	8	16	12	7	3	46	23
5	154	10	18	15	8	1	52	26
6	126	23	34	32	16	0	108	54
	Totals	41	68	59	31	4		

of the highest achievement group and the two lowest achievement groups. The readers in the highest achievement group could understand the test items so well apparently that the mean of their group was high enough above the means of the other achievement groups to make the differences significant. The means of the two lowest groups, in contrast, would be so much lower that the gap between them and the means of the next higher achievement groups would be significant. This appears to be the case with the lowest group. Only four times in all the testing of the means were there non-significant differences affecting the means in the lowest group.

II. ANALYSIS OF VARIANCE BY GRADE AND SEX

To further test the significance of the students' performance on the Connectives Reading Test, an analysis of variance by both grade and sex was conducted. Because it was desirable to observe student performance on both total test scores and on scores on test items grouped according to each of the seventeen connectives, the analysis was designed as a three-factor one (grade, sex, and performance on the Connectives Reading Test) with the third factor counted as a repeated measures of type.[2]

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[2]Ibid., pp. 337-343.

The first measure of this third factor was the students' performance on one of the seventeen connective test item groupings, and the repeat measure was their test performance on all test items.

Assigning factor A to sex, factor B to grade, and factor C to student performance on the Connectives Reading Test, the schematic representation would be:

		Connectives Reading Test Performance	
		Performance on Connective Grouping	Performance on Total Test
Sex	Grade	C_{part}	C_{total}
A_{male}	B_4	$Group_{male\ 4}$	$Group_{male\ 4}$
A_{male}	B_5	$Group_{male\ 5}$	$Group_{male\ 5}$
A_{male}	B_6	$Group_{male\ 6}$	$Group_{male\ 6}$
A_{female}	B_4	$Group_{female\ 4}$	$Group_{female\ 4}$
A_{female}	B_5	$Group_{female\ 5}$	$Group_{female\ 5}$
A_{female}	B_6	$Group_{female\ 6}$	$Group_{female\ 6}$

Each of the student groups, then, was observed under all levels of factor C, but each group was assigned to only one combination of factors A and B. There were 67 students in every one of the six groups.

This same analysis was carried out seventeen times using the connective groupings of factor Cpart in turn. The results are summarized in Table XLII, with the analysis of variance tables in Appendix H.

The main effects of factors A, B, and C are all highly significant at the 0.01 level for a two-tailed test while the interaction of the three together (Factor ABC) is non-significant at the same level. It is apparent that differences in performance on the Connectives Reading Test are affected by both the sex and grade of students beyond the level at which chance factors would operate. Apparently too, student scores on items testing a particular connective differed significantly from their total test scores.

The variance in test scores, however, cannot be attributed solely to the sum of the effects of factors A, B, and C. The effects of different combinations of two factors produced some statistically significant interactions, particularly among connective types such as sentence linkers and co-ordinate connectives. Of the six significant interactions noted between grade and sex, (Factor AB), three were found in the co-ordinate connective group. This suggested that the differences in student performance on the test items of "and," "but," and "for" at any one of the three grade levels, is affected by the sex of the children.

Likewise the significant interaction of sex with student performance (Factor AC) on test items which are either sentence linkers or relative pronouns, indicates that differences in student scores on

TABLE XLII

SUMMARY OF EFFECTS OF GRADE AND SEX ON STUDENT PERFORMANCE ON CONNECTIVES READING TEST

Factor C_{part} Items of:	Main Effects and Interactions of: FACTORS A	B	AB	C	AC	BC	ABC
"although"	xx	xx	ns	xx	ns	ns	ns
"because"	xx	xx	ns	xx	ns	x	ns
"if"	xx	xx	x	xx	ns	xx	ns
"so"	xx	xx	ns	xx	ns	xx	ns
"that"- simple includer	xx	xx	x	xx	ns	ns	ns
"when"	xx	xx	ns	xx	ns	xx	ns
"where"	xx	xx	ns	xx	xx	xx	ns
"that" - relative pronoun	xx	xx	ns	xx	ns	ns	ns
"which"	xx	xx	ns	xx	x	ns	ns
"who"	xx	xx	ns	xx	x	ns	ns
"and"	xx	xx	x	xx	ns	xx	ns
"but"	xx	xx	x	xx	ns	xx	ns
"for"	xx	xx	x	xx	ns	x	ns
"yet"	xx	xx	ns	xx	ns	x	ns
"absent"	xx	xx	ns	xx	ns	xx	ns
"however"	xx	xx	ns	xx	xx	ns	ns
"thus"	xx	xx	ns	xx	xx	ns	ns
Totals:	17xx	17xx	6x 11ns	17xx	3xx 2x 12ns	7xx 3x 7ns	17ns

xx - significant at the 0.01 level for a two-tailed test.

x - significant at the 0.05 level for a two-tailed test.

ns - not significant at the 0.05 level for a two-tailed test.

these groups of test items are dependent on the sex of the students. This interaction, in addition to the simple main effect of the sex factor (A), could mean that the learning graph for girls in these connectives may be different from that of boys. It also leads to speculation as to whether it is boys or girls who have the most trouble understanding the connectives in these connective groupings.

The added complication of interaction between grade and students' performance on the Connectives Reading Test (Factor BC), appeared to affect those test items in the subordinate simple includer and co-ordinate classes of connectives. Differences in achievement scores are dependent on the students' grade levels for these connective groupings beyond the differences which the grade factor alone could be expected to bring about.

Four connectives, then, showed significant interactions among two sets of two factors (for example, both factors, AB and BC), the connective "if" and three co-ordinate connectives, "and," "but," and "for." These four connectives and others showing a significant interaction were graphed and a "F" test was completed to pinpoint the places of significant differences between the interacting factors. Although it was known that grade and sex interact to produce real differences in test scores of three of the co-ordinate connectives, it is not yet known at which of the three grade levels the performance of boys differs significantly from that of girls.

The results of the tests for significance of grade and sex interactions (Factor AB) in Figure 10 have been graphed. The calculations are in Appendix I. All of the differences were significant between the test performance of boys and girls at both grades four and five. In only one case, that of the connective "but," was there a significant difference at the grade six level. In addition to the main effects of both grade and sex noted separately, for the five connectives shown, at both grades four and five, the performances of boys were significantly below that of girls. In these grades the boys appear to lag behind the girls in their ability to conjoin ideas and to handle some concepts involving conditons. Therefore, it seems reasonable to suggest that the teacher in the classroom should also consider the adequacy of the level of understanding girls have. It may be that not only boys but also girls may need special help with these connectives.

Similarly, in the graphs in Figure 11 which show the results of tests for significance of sex and the Connectives Reading Test performance interactions (Factor AC), all differences between the total test scores of boys and girls were significant. From previous test results this finding was expected. The girls did significantly better than the boys according to total test scores. However, the graphs also showed that for five particular connectives differences in test scores for the items of these connectives were also significant. Not only therefore, do boys need special help to bring their total test performance to the level of the girls but they may need

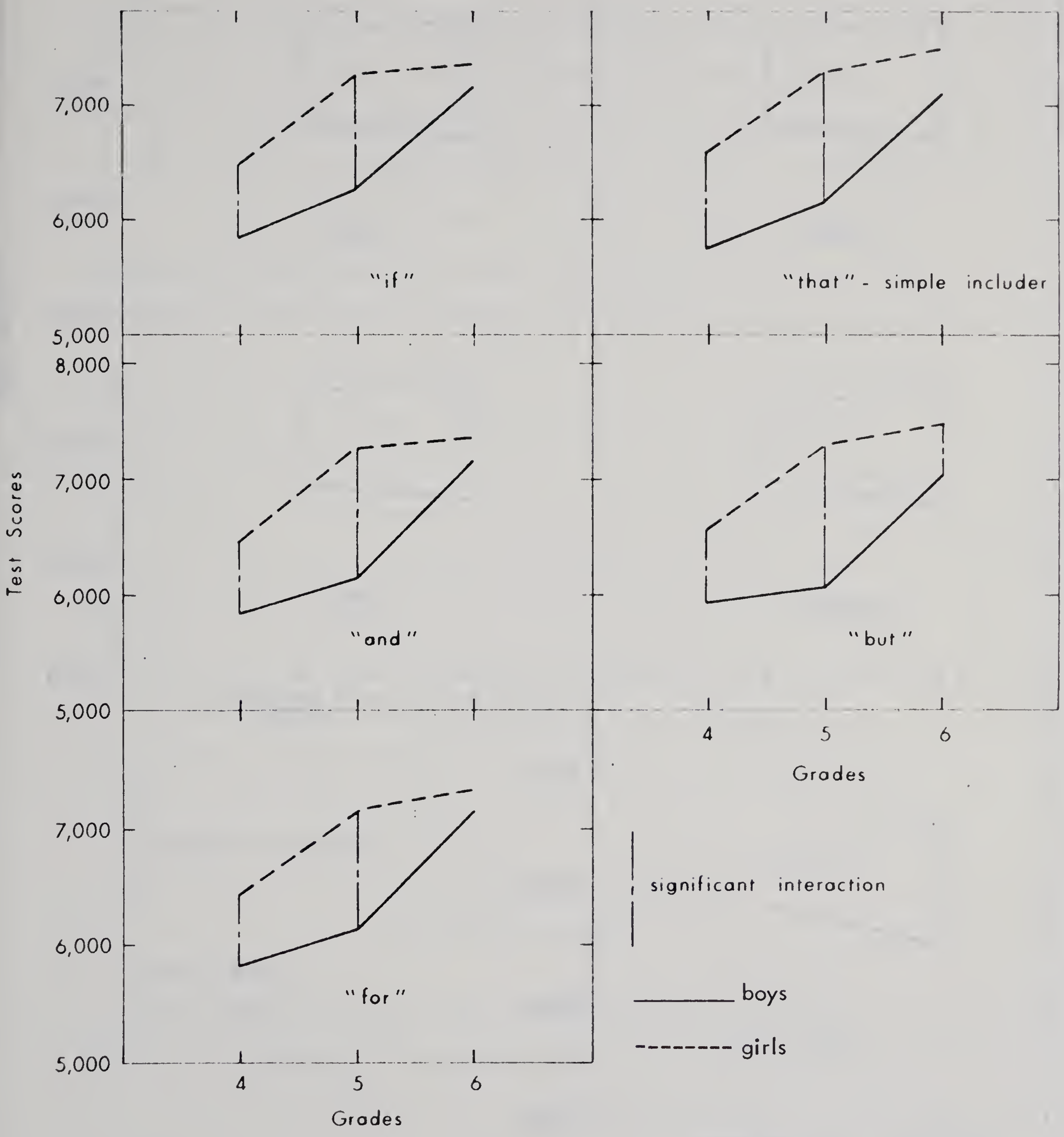

Fig. 10 RESULTS OF TESTS FOR SIGNIFICANCE OF GRADE AND SEX INTERACTIONS (FACTOR AB)

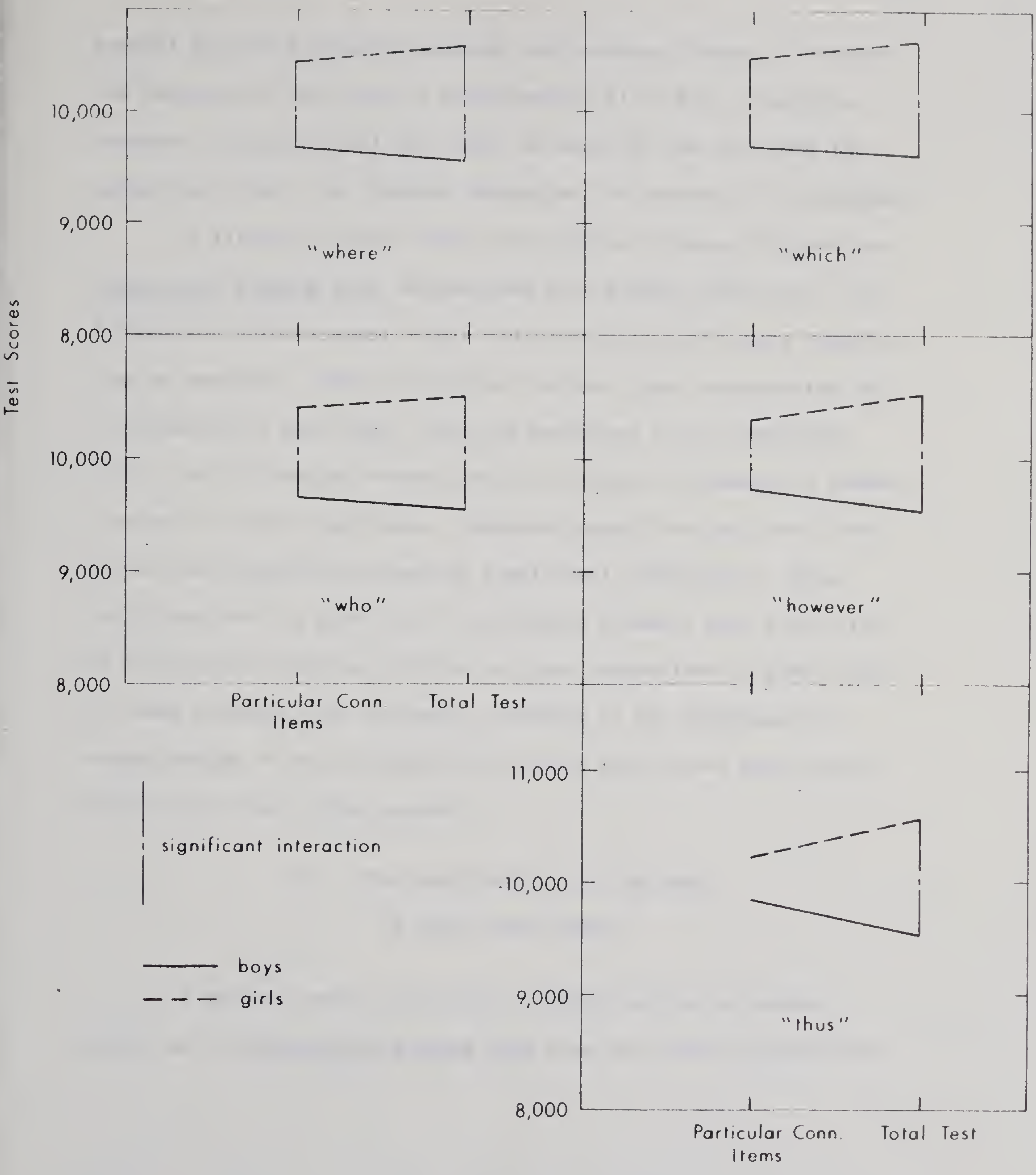

Fig. 11 RESULTS OF TEST FOR SIGNIFICANCE OF SEX AND CONNECTIVES READING TEST PERFORMANCE INTERACTIONS (FACTOR AC)

special help with relative pronouns and sentence linkers. Here too, the adequacy of the level of understanding girls have, should be assessed. They may need help also, as would be the case with the connective "thus," the hardest connective for students to comprehend.

In Figures 12 and 13 where the results of tests of grade and Connectives Reading Test interactions were graphed (Factor BC), all differences between grade levels and total test scores were significant as expected. Where scores for the test items representing the ten connectives were shown, (the one exception is the connective "if"), the differences between the test scores of students in grades five and six were significant. Between grades five and four, four of the ten connectives showed no significant interaction. This could mean that in grade four the children showed a much slower rate of development than they did for the same connectives in grade five. It seems probable that systematic training in the development of understanding of these connectives at this grade level might accelerate their rate of development.

III. THREE-WAY ANALYSIS OF VARIANCE ON TOTAL TEST SCORES

To further assess the effect of grade and sex on student scores on the Connectives Reading Test when the factor of population

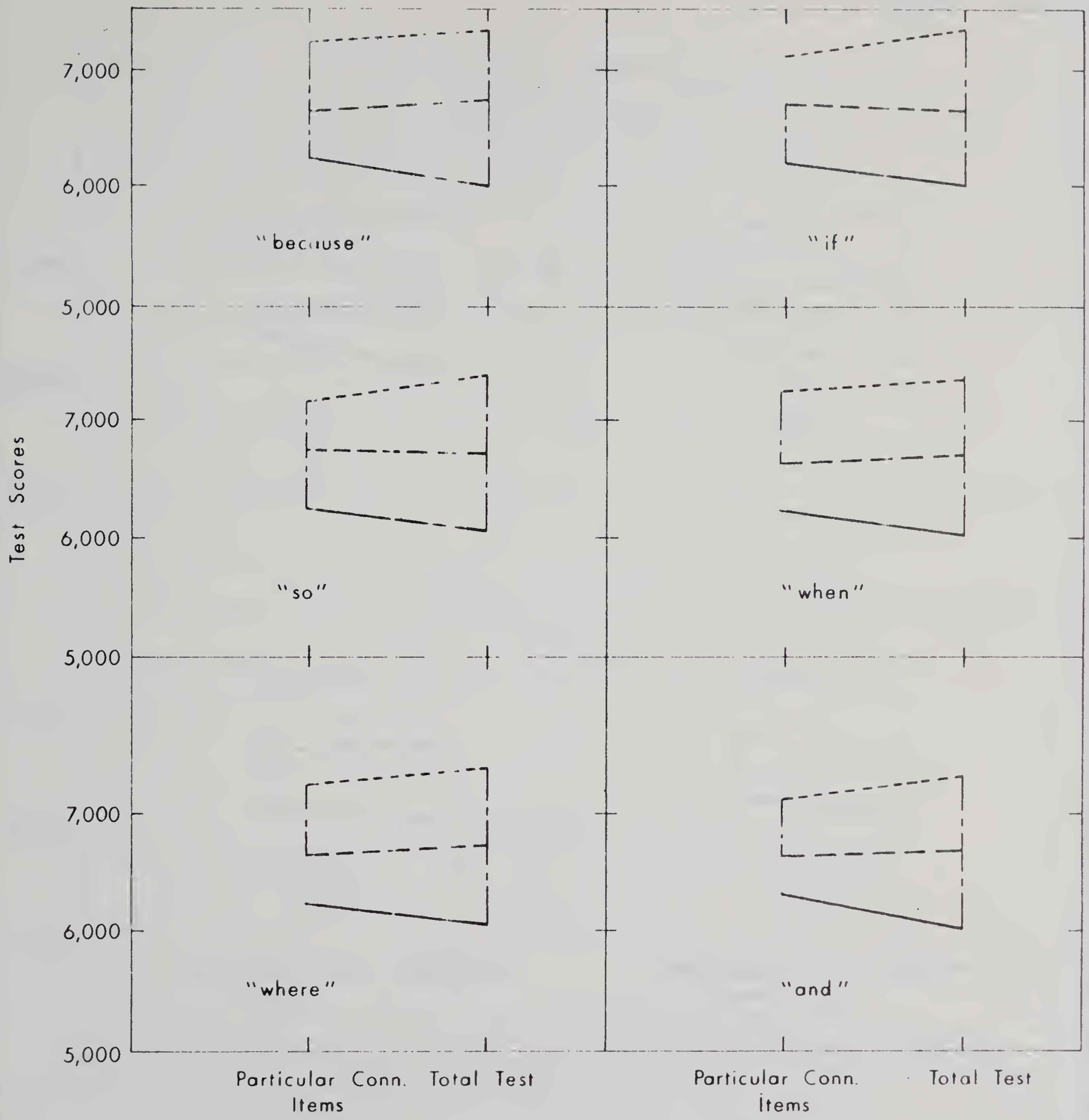

Fig. 12 RESULTS OF TESTS FOR SIGNIFICANCE OF GRADE AND CONNECTIVES READING TEST INTERACTIONS (FACTOR BC)

| significant interaction

- - - - - Grade 6
— — — " 5
——— " 4

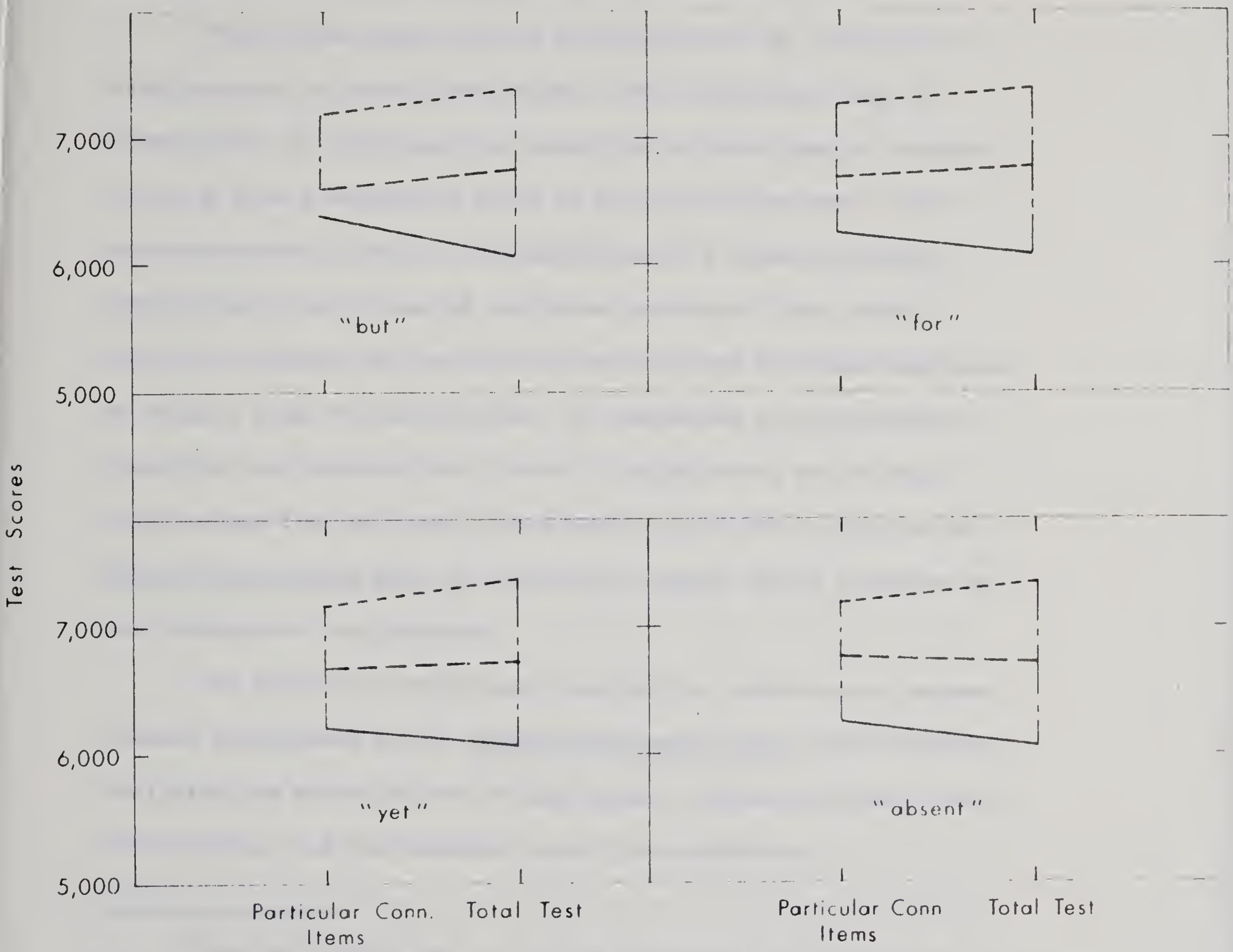

Fig. 13 RESULTS OF TEST FOR SIGNIFICANCE OF GRADE AND CONNECTIVES READING TEST INTERACTIONS (FACTOR BC)

strata was added, and to identify interactions among the three factors, this analysis of variance was undertaken.[3]

The program permitted the calculation of "F" statistics using squared multiple correlations. The statistical test of significance is based upon the reduction in error sums of squares in going from a restricted model to an unrestricted one.[4] The restricted model directs the computation of a squared multiple correlation in which one of the three predictors (sex, grade, population strata) or one of their interactions has been restricted or dropped from the calculation. By comparison of this computation with one obtained from a model in which there was no such restriction, the increase in predictability of test scores on the Connectives Reading Test in knowing the effect of the predictor or its interaction was assessed.

The multiple correlations here are the correlations between student performance on the Connectives Reading Test (the criterion variable) the three factors of sex, grade, population strata, their interactions, and the weighted sum of the predictors.

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[3] Program adapted for use on the University of Alberta IBM 7040 system by S. Hunka, M. Wahlstrom, and J. Carlson from Applied Multiple Linear Regression by Robert A. Bottenberg and Joe H. Ward, Jr., (Technical Documentary Report PRL-TDR-6306, March 1963), from the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce.

[4] S. Hunka, M. Wahlstrom and J. Carlson, Persub Reference Manual, University of Alberta, Division of Educational Research Services, August, 1965, p. 7.

The three factors of sex, grade, and population strata with their interactions were weighted to minimize the sums of squares of the error. To maximize the correlations between the criterion variable and the sums of scores on the dependent variables, a standardized beta weight for each of the three predictors and their interactions was computed. Each of these weights was multiplied by a ratio consisting of the standard deviation of the Connectives Reading Test divided by the standard deviation for the predictor variable. The resulting number represented the weight which when added to a constant, was the raw score mean for that variable. By weighting the predictors and their interactions in this way, the system of weights which would yield the highest correlation between the criterion variable (the Connectives Reading Test) and the weighted sum of the predictors, was found. This procedure would, of course, reduce the error sums of squares.

In this analysis as in the former one, both the factors of sex and grade were highly significant, so it can be reiterated that both factors exerted effects on the students' scores of the Connectives Reading Test far beyond what could have been expected by chance (Table XLIII). In addition, the population strata affected student scores significantly at the 0.01 level of significance for a two-tailed test. How well the students understood the test items, then, was affected by their sex, grade, and their place of residence in city, town, or country.

TABLE XLIII

SUMMARY OF THREE-WAY ANALYSIS OF VARIANCE ON TOTAL SCORES OF <u>CONNECTIVES READING TEST</u>

Non-Restricted Multiple Correlation Coefficient R_1^2	Restricted Multiple Corr. Coefficient R_2^2	Restriction of Predictor or Interaction Predictor	df Num.	df Denom.	F*	P (Two-Tailed Test)
0.2979 (incl. three factors and interactions)	0.2937	Sex by Grade by Population Strata Interaction (ABC Interaction)	4	384	0.57	$p > .05$
0.2937 (as above less ABC interaction)	0.2817	Sex by Grade Interaction	2	388	3.31	$p > .05$
0.2937 (as above)	0.2814	Sex by Population Strata Interaction	2	388	3.39	$p > .05$
0.2937 (as above)	0.2782	Grade by Population Strata Interaction	4	388	2.14	$p > .05$
0.2538 (incl. three factors only)	0.1873	Sex Factor	1	396	35.29	$p < .001$
0.2538 (as above)	0.1071	Grade Factor	2	396	38.92	$p < .001$
0.2538 (as above)	0.2132	Population Strata Factor	2	396	10.77	$p < .001$

$$^*F = \frac{(R_1^2 - R_2^2) / df_{num.}}{(1 - R_1^2) / df_{denom.}}$$

In contrast, however, none of the interactions of these three factors was significant at either the 0.05 or the 0.01 levels of significance for a two-tailed test. Both the sex by grade and the sex by population strata interactions would have been significant at the 0.05 level of significance for a one-tailed test. With the entrance of the population strata factor into the analysis of variance, the significant interactions noted previously did not exert a significant effect on the scores of the test. Apparently then, the sex by grade interaction is not influenced by where the child lives.

Null hypothesis 1 which states that there is no significant relationship between the understanding a child has of connectives and sex is untenable. There is a significant relationship at the 0.001 level.

IV. TWO-WAY ANALYSIS OF VARIANCE ON TOTAL TEST SCORES BY GRADE

As there had been such a strong developmental aspect noted in the increase of student understanding of connectives from grade to grade, the total test scores of students on the Connectives Reading Test were divided by grade, and their variance analyzed by sex and population strata.

The program followed closely that reported in the previous section, with a summary of the results in Table XLIV. The sex by population strata interactions were not significant at any grade level but the main effects of both factors were.

TABLE XLIV

SUMMARY OF TWO-WAY ANALYSIS OF VARIANCE ON TOTAL SCORES ON CONNECTIVES READING TEST BY GRADE

Grade	Non-Restricted Multiple Correlation Coefficient R_1^2	Restricted Multiple Corr. Coefficient R_2^2	Restriction of Predictor or Predictor Interaction	df Num.	df Denom.	F^*	P (Two-Tailed Test)
Grade:							
4	0.1090	0.1055	Sex by Population Strata Interaction	2	122	0.24	$p > .05$
5	0.2941	0.2717				1.93	$p > .05$
6	0.867	0.0493				2.50	$p > .05$
(Incl. two factors and their interactions)							
4	0.1055	0.0389	Sex factor	1	128	9.54	$p < .01$
5	0.2717	0.1165				27.28	$p < .001$
6	0.0493	0.0226				3.59	$p > .05$
(as above less sex by pop. strata interaction)							
4	0.1055	0.0666	Population Strata Factor	2	128	2.78	$p > .05$
5	0.2717	0.1552				10.24	$p < .001$
6	0.0493	0.0267				1.52	$p > .05$
(as above)							

$$^*F = \frac{(R_1^2 - R_2^2) / df_{num.}}{(1 - R_1^2) / df_{demon.}}$$

The sex factor was significant at the 0.01 level for a two-tailed test at both the grade four and five levels. In each case the means of the girls exceeded those of the boys. (Table XLV). However, at the grade six level the difference was not significant indicating that now the boys' scores were close to the girls. Definite help in the classrooms for boys in grades four and five would be indicated.

Only at the grade five level was there a significant difference for the population strata factor. The means indicated that urban and small town students were working almost on a par but those from rural areas were lagging. As this difference was no longer apparent at the grade six level, rural children may need more help at grade four and five levels to overcome the lag sooner.

V. TWO-WAY ANALYSIS OF COVARIANCE ON TOTAL TEST SCORES BY GRADE

This analysis paralled that of the preceding section except for the added statistical control of five covariants. The five were identified in the preceding chapter as student achievement on the STEP Listening, Reading, and Writing Tests and on the SCAT Tests, both the verbal and the non-verbal sections.

Table XLVI offers a summary of the results. The sex by population interaction was not significant here, nor had it been in the two-way analysis of variance.

TABLE XLV

COMPARISONS OF MEANS FOR GROUPS SHOWING SIGNIFICANT "F" RATIOS IN TWO-WAY ANALYSIS OF VARIANCE ON TOTAL TEST SCORES BY GRADE

Variable	Grade	Group in Variable	Weight	Constant	Mean for Group*	Significance of Differences
Sex	4	girls	0.00	92.81	92.81	xx
		boys	-14.66	92.81	78.15	
	5	girls	0.00	111.51	111.51	xx
		boys	-23.67	111.51	84.84	
	6	girls	0.00	117.25	117.25	ns
		boys	-7.72	117.25	109.53	
Population Strata	4	urban	8.80	81.82	90.62	
		small town	-6.76	81.82	75.06	ns
		rural	0.00	81.82	81.82	
	5	urban	5.45	103.06	108.52	
		small town	0.00	103.06	103.06	xx
		rural	-16.50	103.06	86.56	
	6	urban	7.11	109.79	116.90	
		small town	0.00	109.79	109.79	ns
		rural	0.00	109.79	109.79	

* - Persub Reference Manual, _op_. _cit_., p. 14.

xx - significant at the 0.01 level for a two-tailed test.

ns - not significant at the 0.05 level for a two-tailed test.

TABLE XLVI

SUMMARY OF TWO-WAY ANALYSIS OF COVARIANCE ON TOTAL SCORES ON CONNECTIVES READING TEST BY GRADE

Non-Restricted Multiple Correlation Coefficient R_1^2		Restricted Multiple Corr. Coefficient R_2^2	Restriction of Predictor or Predictor Interaction	df Num.	df Denom.	F*	P (Two-Tailed Test)
Grade:							
4	0.7861	0.7795	Sex by Population Strata Interaction	2	116	1.81	$p > .05$
5	0.8717	0.8705				0.56	$p > .05$
6	0.8445	0.8383				2.30	$p > .05$
(incl. five covariants, two factors and interaction)							
4	0.7795	0.7772	Sex Factor	1	123	1.29	$p > .05$
5	0.8705	0.8644				5.73	$p < .05$
6	0.8383	0.8383				0.01	$p > .05$
(as above less sex by population strata interaction)							
4	0.7795	0.7540	Population Strata Factor	2	123	7.11	$p < .01$
5	0.8705	0.8676				1.36	$p > .05$
6	0.8383	0.8198				7.04	$p < .01$
(as above)							

$$*F = \frac{(R_1^2 - R_2^2) / df_{num.}}{(1 - R_1^2) / df_{denom.}}$$

With the more stringent control, the sex factor now showed only a significant "F" at the 0.05 level for a two-tailed test in grade five whereas in the analysis of variance both grade four and five had significant differences at the 0.01 level.

The population strata factor, on the other hand, now showed significant differences among the strata at both the grade four and six levels, a reversal of results registered in the analysis of variance.

It appears, then, that both sex and population strata factors still exert some effect on total grade scores of the Connectives Reading Test even when initial differences represented by the five covariants have been removed. The population strata factor particularly, appears to be a most powerful one.

VI. THREE-WAY ANALYSIS OF COVARIANCE

Described as a three-way analysis of covariance with five covariants, the program used the linear regression theory reported in section three.[5] The three factors of grade, sex, and population strata were assessed again with the statistical control of the same five covariants used in the two-way analysis. As before, there was the calculation of "F" statistics using squared multiple correlations with the statistical tests of significance based on a reduction in the error sums of squares in going from the restricted model to an unrestricted one. However, now, whenever the restricted model

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[5]Persub Reference Manual, op. cit., pp. 16-20.

directed the computation of a squared multiple correlation in which one of three predictors (sex, grade, or population strata) or one of their interactions was restricted in the calculation, each one of the five covariants was retained in the restricted model. The increase for a predictor in the predictability of test scores on the Connectives Reading Test came by noting as before, the increase in the error sums of squares which was produced when that predictor was dropped from the unrestricted model. The increase now is that over and above the error sums of squares resulting by the retention of the five covariants. The restricted model always retained that portion of the error sums of squares which was due to the effects of the five covariants, thereby holding constant their effect on total test scores of the Connectives Reading Test. Otherwise, the program proceeded as noted above in the three-way analysis of variance.

Table XLVII gives a summary of the three-way analysis of covariance with the five covariants. With the further statistical control of the five variables, the factors of grade and sex are no longer significant predictors of the total test scores of the Connectives Reading Test. Population strata is, however, a significant factor. As the differences represented by the three STEP tests in reading, writing, and listening, and the two SCAT tests (verbal and non-verbal sections) would be attributes such as intelligence and verbal comprehension, their very close relationship to grade would be expected. However, when the covariants are held constant the effects

TABLE XLVII

SUMMARY OF THREE-WAY ANALYSIS OF COVARIANCE WITH FIVE COVARIANTS ON TOTAL SCORES OF CONNECTIVES READING TEST

Non-Restricted Multiple Correlation Coefficient R_1^2	Restricted Multiple Corr. Coefficient R_2^2	Restriction of Predictor or Predictor Interaction	df Num.	df Denom.	F^*	P (Two-Tailed Test)
0.8559 (incl. five covariants, three factors and their interactions)	0.8526	Sex by Grade by Population Strata Interaction (ABC Interaction)	4	379	2.15	$p > .05$
0.8526 (as above less ABC interaction)	0.8513	Sex by Grade Interaction	2	383	1.76	$p > .05$
0.8526 (as above)	0.8519	Sex by Population Strata Interaction	2	383	1.01	$p > .05$
0.8526 (as above)	0.8482	Grade by Population Strata Interaction	4	383	2.90	$p < .05$
0.8461 (incl. five covariants and three factors)	0.8445	Sex Factor	1	391	3.90	$p > .05$
0.8461 (as above)	0.8439	Grade Factor	2	391	2.72	$p > .05$
0.8461 (as above)	0.8363	Population Strata Factor	2	391	12.40	$p < .001$

$$^*F = \frac{(R_1^2 - R_2^2) / df_{num.}}{(1 - R_1^2) / df_{denom.}}$$

of sex and grade are not significant. With population strata on the other hand, the reverse is true. Despite the statistical control of the covariants, where a child lives still significantly affects his test scores on the Connectives Reading Test. Of the interactions, only the grade by population strata interaction was significant, emphasizing that grade level in urban, small town, or rural areas of residence is a combination factor of importance.

VII. FACTOR ANALYSIS

Principal-Axis Factor Analysis

In contrast to the completed analyses of variance where a single measure, the Connectives Reading Test, was administered over a series of conditions such as grade or sex, to determine the significance of group differences, this factor analysis was used to identify common sources of variation in individual differences. The purpose, then, of the factor analysis was to determine whether the variations of total test scores of the Connectives Reading Test could be accounted for by a number of smaller basic categories than the criterion factor, the connectives which are present in each test item.

The seventeen connective groupings were set out in contrast to five other components, the first of which was the total scores on the Connectives Reading Test (Table XLVIII). These figures very closely approximate the correlations of the total test scores with the scores

TABLE XLVIII

PRINCIPAL-AXIS FACTOR ANALYSIS

Factors Items Testing:	Commu-nalities	Components of Correlation Matrix 1	2	3	4	5
although	0.789	0.861	0.071	-0.000	-0.043	-0.201
because	0.740	0.824	-0.164	0.015	-0.174	-0.061
if	0.825	0.826	-0.072	-0.314	-0.176	0.087
so	0.750	0.846	-0.129	-0.041	-0.123	-0.036
that - simple includer	0.932	0.770	0.088	-0.293	0.470	-0.161
when	0.718	0.837	-0.045	0.110	-0.049	0.030
where	0.777	0.861	-0.162	-0.069	-0.070	-0.001
that - relative pronoun	0.793	0.880	-0.051	0.091	-0.063	-0.071
which	0.731	0.821	0.106	0.194	0.051	-0.078
who	0.714	0.815	-0.029	0.182	0.090	0.087
and	0.750	0.818	-0.021	0.024	0.265	0.097
but	0.815	0.832	-0.070	-0.042	-0.126	-0.317
for	0.800	0.825	0.030	-0.025	-0.039	0.342
yet	0.715	0.832	-0.099	-0.098	0.025	-0.039
"absent"	0.794	0.818	-0.163	-0.032	0.067	0.304
however	0.821	0.772	0.198	0.426	0.063	-0.021
thus	0.967	0.609	0.736	-0.159	-0.158	0.065
Totals:	13.432	11.335	0.728	0.503	0.442	0.424

on each of the seventeen connective groupings. The column headed "communalities" represented the proportion of the total variance of the test which is held in common with the general factor.[6]

When the average sum of each of the squared figures in the communalities column was taken, and that figure was multiplied by 100,[7] the total variance represented by the communalities was 63 per cent. The seventeen connective groups of scores represent 63 per cent of the total test variance.

From the low totals of the other columns it can be seen that the variance they represented in the total test would be a small per cent each. The _Connectives Reading Test_, then, appeared to be a unifactor one. As the test items all contained at least one connective in them, this common factor could reasonably said to be at least a portion of the factor accounting for the test variance.

The results indicated that the _Connectives Reading Test_ is, in this investigation, the best measure of reading comprehension of the seventeen connectives. There do not appear to be smaller basic categories which account for more than a comparatively small source of variation in student total test scores.

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[6]Benjamin Fruchter, _Introduction to Factor Analysis_ (Toronto: D. Van Nostrand Company, Inc., 1954), p. 9.

[7]George A. Ferguson, _Statistical Analysis in Psychology and Education_ (Toronto: McGraw-Hill Book Company Inc., 1959), pp. 107-108.

SUMMARY

From the analyses of this chapter a number of facts have emerged about the significance of the students' performance on the _Connectives Reading Test_.

In the one-way analysis of variance by grade, there was a significant increase in total test scores from one grade level to another. In addition, there was a real difference between all seventeen groups of scores representing the connectives being tested, and the total test scores on the _Connectives Reading Test_. The differences among the means of the five achievement groups based on total test scores on the connectives test, were almost all real differences for the total test group. In both grades four and five, about one-third of these means were not significantly different one from the other and in grade six, about two-thirds of the means showed no significant difference.

From the three factor analysis, it was learned that both grade and sex affected total test scores on the _Connectives Reading Test_ significantly, and that student scores on items testing a particular connective differed significantly from their total test scores. Various sets of interactions showed that for some connective groups, the combined working of two factors was a positive influence in the learning environment. Further investigation showed that in grades four and five, the boys appeared to lag in their reading comprehension of connectives behind the girls, particularly in

the use of co-ordinate connectives and connectives associated with the expression of condition.

In the three-way analysis of variance, in addition to confirming that both grade and sex were factors which exerted marked effects on total test scores in the Connectives Reading Test, it was noted that the population strata factor, that is, place of residence, was significant also.

Through the two-way analysis of variance by grade, the effects of both sex and population strata could be better assessed at each grade level. The needs of boys in grades four and five and of rural students in grade five, were revealed.

The five covariants were student achievement in listening, reading, and writing, and in mental ability, both verbal and non-verbal. When these additional statistical controls were applied in the two-way analysis, the sex factor was barely significant at the grade five level only, but the population strata factor showed strong effects in both grades four and six.

In the three-way analysis of covariance by grade, sex, and population strata, only the latter showed a significant effect on total test scores of the Connectives Reading Test. Place of residence exerts a very marked effect on the scores of the reading test.

The conduct of the principal-axis factor analysis showed that the Connectives Reading Test was a unifactor one with the seventeen connective groups of scores accounting for 63 per cent of the total test variance.

Certainly the performance of students on the connectives test was affected by their sex, grade, and place of residence.

Through the statistical control of the covariants it could be seen that there was a factor common to the STEP and SCAT Tests used in the study, one which was common to the Connectives Reading Test also.

CHAPTER IX

FINDINGS: THE WRITTEN CONNECTIVES TEST

The children gave a wide variety of answers to the twenty items of the Written Connectives Test (Appendix B), all of which were marked and entered as percentages of acceptable answers.

This test required the students to encode as well as decode thereby requiring language abilities beyond that of reading. The results, therefore, have been used only for gross comparisons with the Connectives Reading Test. Because the comparisons have been made on the percentages of acceptable answers to which no statistical techniques have been applied, statements made in this chapter are only observations which future investigations would have to confirm.

This chapter will report:

1. The marking of test items of the Written Connectives Test.
2. The percentage of acceptable answers given by the entire student group on all test items by grade, sex, and population strata.
3. The percentage of acceptable answers for individual test items by grade and sex.

I. THE MARKING OF THE TEST ITEMS OF THE WRITTEN CONNECTIVES TEST

The test instructions given to students had warned them that each blank space in the items must be filled with one word only.

Therefore, all answers with more than one word in them were marked wrong. An acceptable answer was a word which in the judgment of the marker filled the blank in such a way that the sentence could be understood.

Some test items had two or more blanks in them and it was apparent to the markers that children could acceptably fill one blank while not another. The total possible marks, therefore, equaled the total number of blanks, twenty-seven.

A number of students changed the punctuation of test items or tried to make two sentences where there was only one on paper. Neither of these practices was allowed.

The answers credited to test items on the tables in this chapter were those used in the basal readers from which eighteen of the test items were extracted. In filling in the blanks, the students used many other acceptable words, some of them adverbs, not connectives at all.

According to the very high Kendall Coefficient of Concordance:W reported in Chapter V, page 149, the markers were all using the same criteria to make their judgments.

II. PERCENTAGE OF ACCEPTABLE ANSWERS OF STUDENTS ON ALL TEST ITEMS OF WRITTEN CONNECTIVES TEST BY GRADE, SEX, AND POPULATION STRATA

When over-all student performances on the Connectives Reading Test and the Written Connectives Test were compared, very little

difference was noted between the percentages of their correct answers. Table XLIX makes the comparison. Notable here was the same trend for a higher total test score from a lower grade to a higher grade in the Written Connectives Test as had been reported earlier in the Connectives Reading Test.

TABLE XLIX

COMPARISON OF THE OVER-ALL ACHIEVEMENT OF THE STUDENTS ON THE CONNECTIVES READING TEST WITH THE WRITTEN CONNECTIVES TEST

Grade	Per Cent of Correct Answers on Connectives Reading Test	Per Cent of Acceptable Answers on Written Connectives Test
4 - 6	66.58	63.74
4	57.29	58.44
5	65.99	63.00
6	74.72	69.77

An interesting trend was apparent, too, from grade four where the percentage of Written Connectives Test answers was very slightly ahead of those on the Connectives Reading Test, to grades five and six where students gained consistently higher percentages on the Connectives Reading Test.

From the analyses of variance previously reported, it was observed that sex, grade, and population strata all exerted a

significant effect on the test scores of the Connectives Reading Test. Figures 14, 15 and 16 show the comparative results for the Written Connectives Test.

The boys and girls of urban areas gained the highest percentage of acceptable answers, with those in small towns and rural areas each getting about four per cent lower than their peers. This was consistent with student performance on the Connectives Reading Test.

When a division according to sex was made, it was found that the boys' scores from urban areas were below the average figures of all students who took the Written Connectives Test with small town boys topping their urban peers. The boys' scores in rural areas were markedly low.

The girls in urban areas had higher scores than either those in small towns or in rural areas. The latter, however, were better than their small town peers and only lagged behind the city girls by about 7 per cent.

A further division of the testing population by grade showed some potential places of strength and weakness. The first over-all glance at the graphs indicated that in the Written Connectives Test as in the Connectives Reading Test, there appeared to be a strong developmental trend from the lower grade to the higher. This was not without exception though, as in the rural group, boys in grade five had a lower percentage of correct answers than did

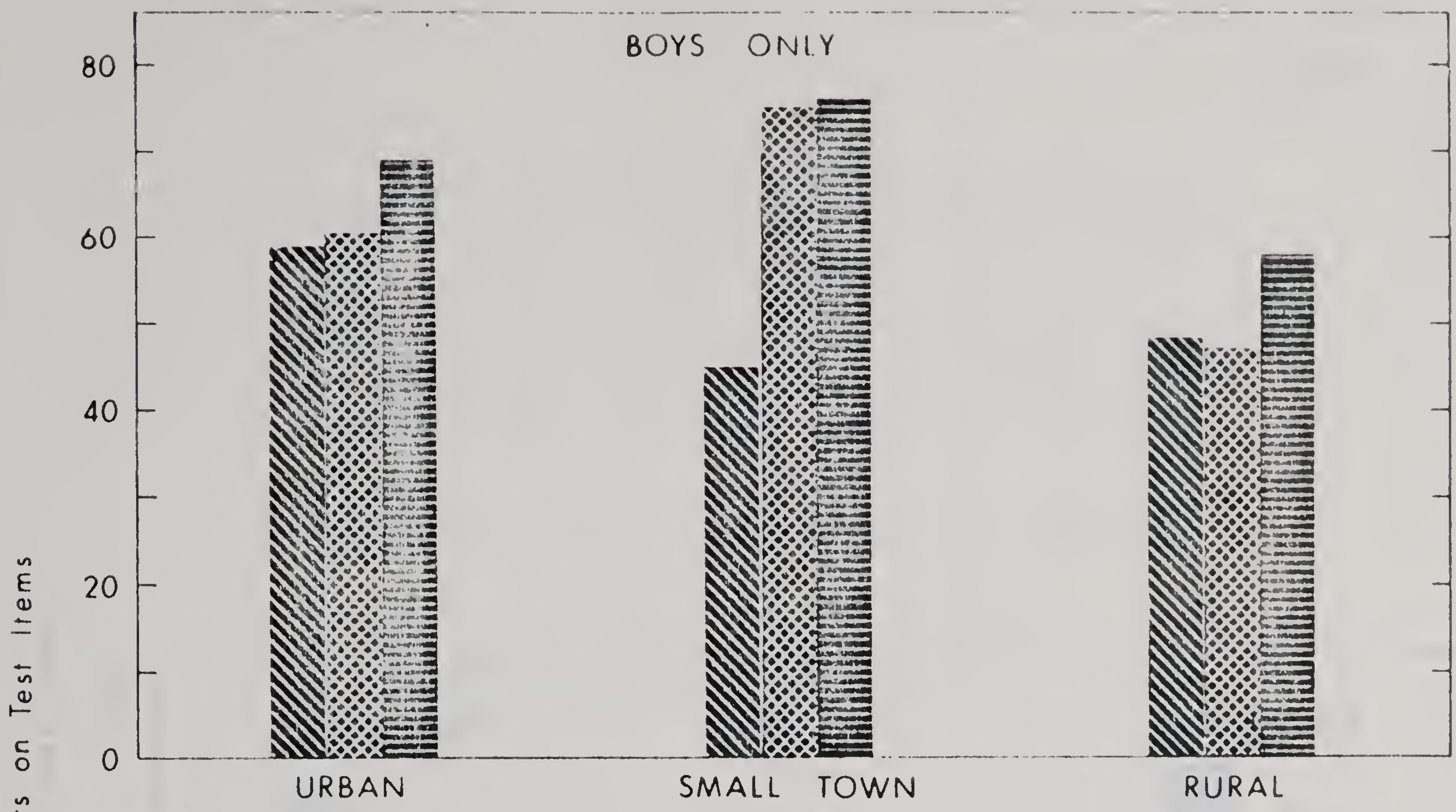

Fig. 15 SUMMARY OF THE ACHIEVEMENT OF THE BOYS IN EACH OF GRADES 4, 5 & 6 ON THE TEST ITEMS OF THE <u>WRITTEN CONNECTIVES TEST</u>

Grade 4 5 6

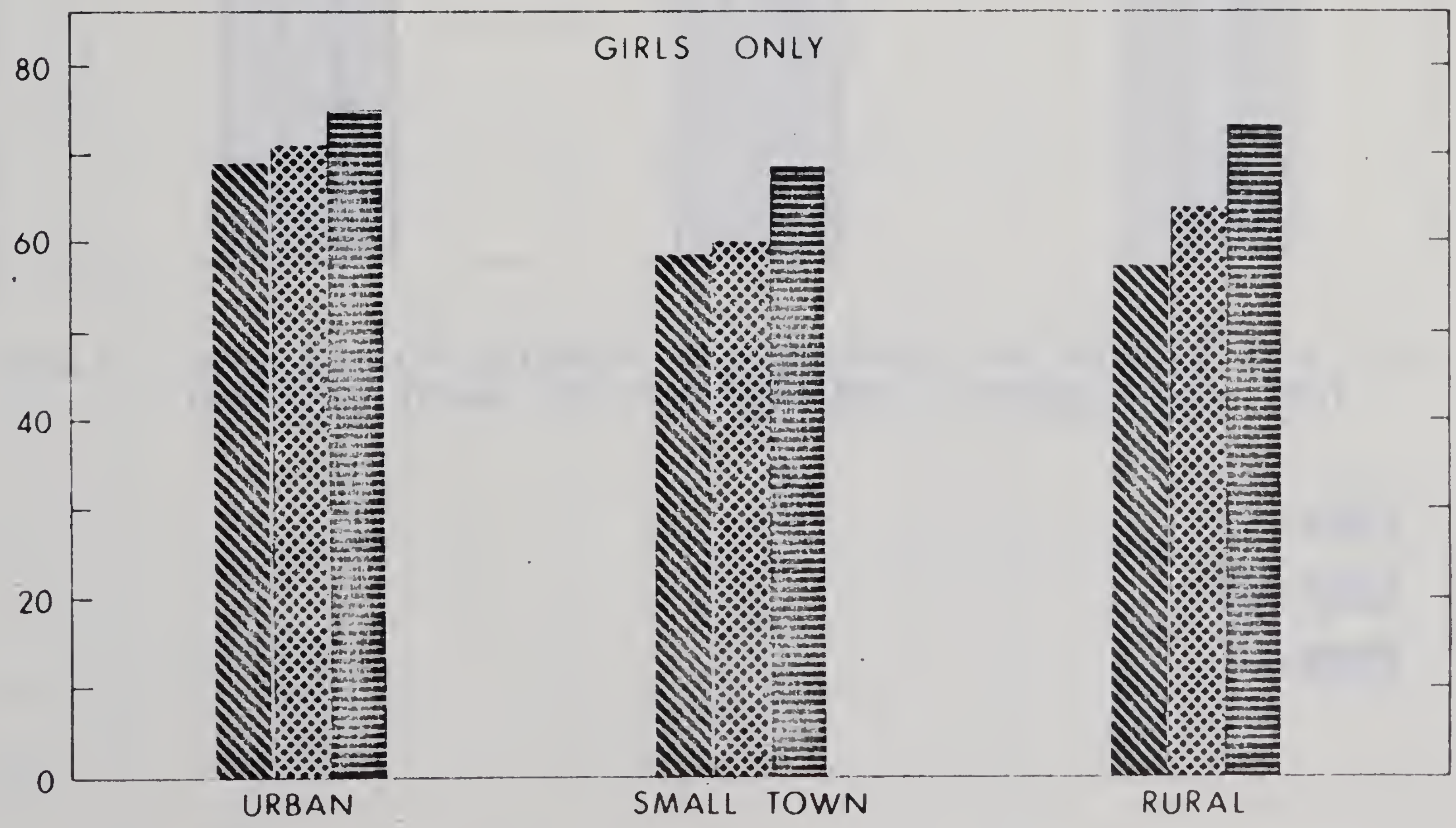

Fig. 14 SUMMARY OF THE ACHIEVEMENT OF THE GIRLS IN EACH OF GRADES 4, 5, & 6 ON THE TEST ITEMS OF THE <u>WRITTEN CONNECTIVES TEST</u>

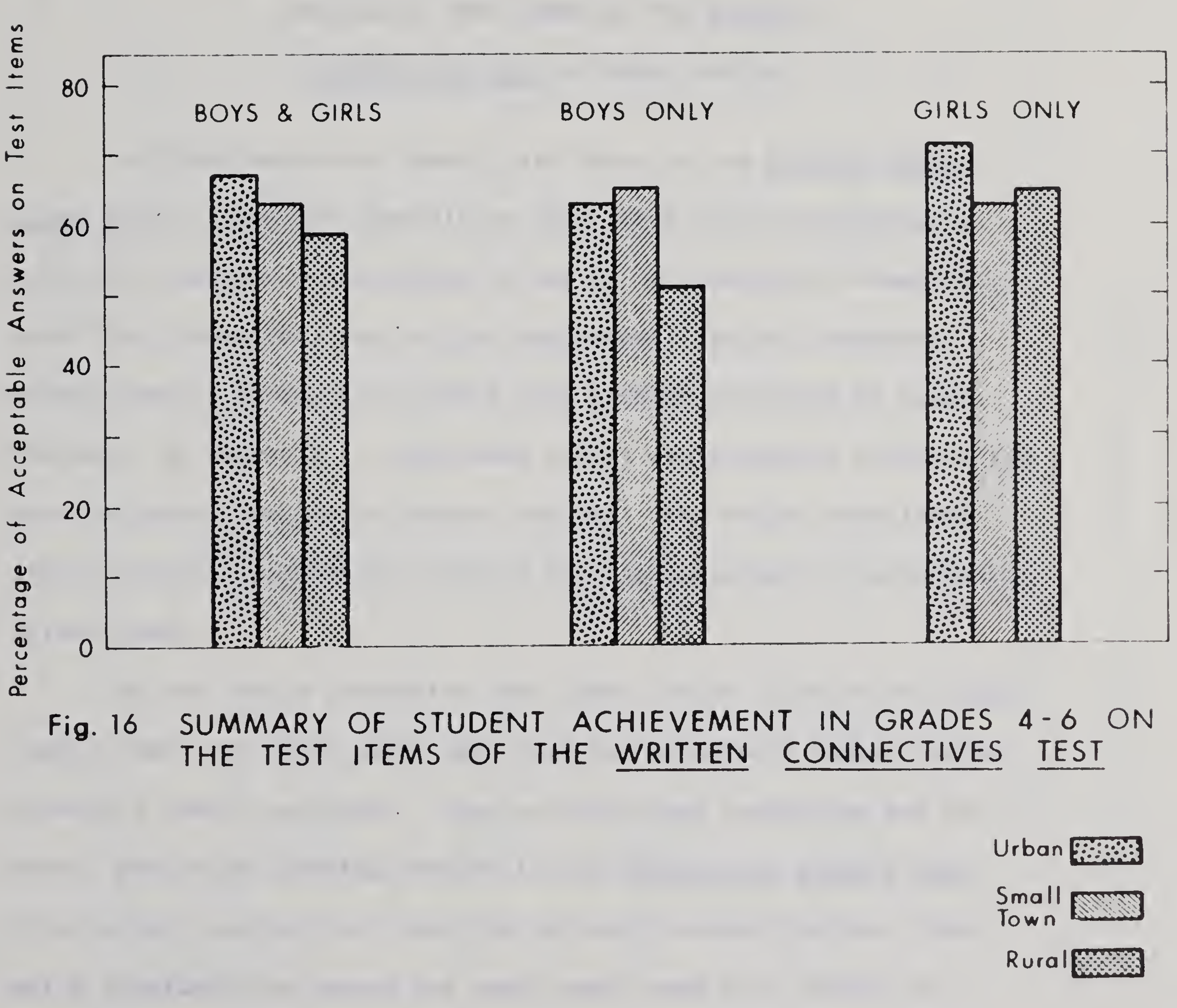

Fig. 16 SUMMARY OF STUDENT ACHIEVEMENT IN GRADES 4-6 ON THE TEST ITEMS OF THE WRITTEN CONNECTIVES TEST

those in grade four. The ground lost had been recovered in part in grade six, although the total per cent here was at least 10 per cent below that of urban boys and about 15 per cent below that of small town boys who made a very strong showing on the test.

III. PERCENTAGE OF ACCEPTABLE ANSWERS OF STUDENTS ON INDIVIDUAL TEST ITEMS OF THE WRITTEN CONNECTIVES TEST BY GRADE AND SEX

As there were only twenty test items in the Written Connectives Test, it was not possible to group them either according to type of connective or according to one of the seventeen connectives. Each item, therefore, was tallied separately. Table L presents percentages of acceptable answers with student divisions by grade and sex. In Appendix J, additional tables are presented with tallies made by grade, population strata, and sex. The twelve additional tables give more information but do not add measurably to statements already made.

Of the single connective test items, those in which "although," "and," "yet" and "who" could have been the acceptable answer, registered the lowest per cents. The last mentioned connective had not been a particular reading problem in the Connectives Reading Test. Of note too, was the fact that the two multi-connective test items which contained the lowest per cents were those with "which" in them.

TABLE L

STUDENT ACHIEVEMENT ON SELECTED ITEMS OF THE WRITTEN CONNECTIVES TEST
(BY GRADE AND SEX)

Grade	Number of Students	Sex	ITEM NUMBER * 13 "although"	10 "because"	20 "because"	1 "if"	15 "so"	9 "when"	11 "where"
4	132	Boys = 65	23.07%**	64.61%	76.92%	80.00%	72.30%	64.61%	78.46%
		Girls = 67	32.83	82.08	80.59	82.08	79.10	82.08	88.05
		N = 132	28.03	73.48	78.78	81.06	75.75	73.48	83.33
5	130	Boys = 63	26.98	68.25	76.19	90.47	66.66	87.30	82.53
		Girls = 67	40.29	91.04	88.05	83.58	74.62	88.05	97.01
		N = 130	33.84	80.00	82.30	86.92	70.76	87.69	90.00
6	132	Boys = 66	48.48	78.79	90.91	89.39	80.30	84.85	89.39
		Girls = 66	46.96	89.39	90.91	90.91	86.36	92.42	90.91
		N = 132	47.72	84.09	90.91	90.15	83.33	88.63	90.15
Total	394	Boys = 194	32.98	70.61	81.44	86.59	73.19	78.86	83.50
		Girls = 200	40.00	87.50	86.50	85.50	80.00	87.50	92.00
		N = 394	36.54	79.18	84.01	86.04	76.64	83.24	87.81

* These are the connectives which were used in the sentences from the reader series after which the test items were patterned.

** The percentage of acceptable answers.

TABLE L (continued)

Grade	Number of Students	Sex	ITEM NUMBER 18 "and"	16 "but"	19 "but"	12 "for"	17 "yet"	14 "who"	5 "thus"
4	132	Boys = 65	43.08%	66.15	61.54	84.62	43.08	38.46	80.00
		Girls = 67	58.21	79.10	73.13	85.07	46.27	50.75	70.15
		N = 132	50.76	72.73	67.42	84.85	44.70	44.70	75.00
5	130	Boys = 63	44.44	60.32	65.08	80.95	55.56	50.79	87.30
		Girls = 67	52.24	70.15	80.60	76.12	55.22	62.69	83.58
		N = 130	48.46	65.38	73.08	78.46	55.38	56.92	85.38
6	132	Boys = 66	57.58	72.73	87.88	83.33	46.97	60.61	87.88
		Girls = 66	66.67	81.82	92.42	83.33	68.18	71.21	90.91
		N = 132	62.12	77.27	90.15	83.33	57.58	65.91	89.39
Total	394	Boys = 194	48.45	66.49	71.65	82.99	48.45	50.00	85.05
		Girls = 200	59.00	77.00	82.00	81.50	56.50	61.50	81.50
		N = 394	53.81	71.83	76.90	82.23	52.54	55.84	83.25

TABLE L (continued)

Population Strata	Number of Students	Sex	ITEM NUMBERS 4 "although-that"	7 "but-which"	3 "that-and-because"	8 "that-where"	2 "that-which"	6 "when-that"
4	132	Boys = 65	44.61	0.00	3.07	60.00	38.46	40.00
		Girls = 67	68.65	1.49	22.38	82.08	49.25	58.20
		N = 132	56.81	0.75	12.87	71.21	43.93	49.24
5	130	Boys = 63	50.79	0.00	11.11	69.84	39.68	55.56
		Girls = 67	67.16	0.00	28.36	85.07	55.22	65.67
		N = 130	59.23	0.00	20.00	77.69	47.69	60.77
6	132	Boys = 66	66.67	3.03	10.61	74.24	42.42	63.64
		Girls = 66	77.27	7.58	33.33	92.42	48.49	69.70
		N = 132	71.97	5.30	21.97	83.33	45.46	66.67
Total	394	Boys = 194	54.12	1.03	8.25	68.04	40.21	53.09
		Girls = 200	71.00	3.00	28.00	86.50	51.00	64.50
		N = 394	62.69	2.03	18.27	77.41	45.69	58.88

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

The item in which a sentence linker such as "thus" could have been used, was no problem to the children. A high percentage of them answered acceptably with most children using a sentence linker of their own choice but never "thus." This bears good testimony to the problems children face in reading where language changes in print tend to lag behind those of oral language. Students are compelled to read and understand connectives which others choose to use. Most of the written language in school texts is formal and uses many language structures unparalleled in the child's informal everyday speech, thereby, often precipitating a reading comprehension problem.

Among all population strata groups of the girls and of the urban boys, the rate of increase was greater from grade five to six than from grade four to five. A tremendous spurt in achievement from grade four to five by boys in small towns was marked, as was their almost negligible increase to grade six. With the exception of grades five and six in the small town group, girls did better than boys on the Written Connectives Test.

The figures from which the graphs (Figures 14, 15, and 16) were made, are in Appendix J.

In the multi-connective test items the "but-which" pairing was very difficult for children, although when their performance is compared to the "but" item (test item no. 16), it can be deduced that they can make the connection when they have a preceding sentence

to alert them to the necessity. No preceding sentence was given in the "yet" item (test item no. 7) intentionally, to see if the children would think of writing in a sentence linker or a co-ordinate connective without this stimulus. They did not do so and the few children who put in an acceptable answer, used adverbs cleverly. Not one acceptable connective was given. Perhaps of more interest than the comments of children about this item were those of some teachers. Several of them commented that there was no answer for the first blank of the "yet" item (test item no. 7). Teachers fearing the use of sentence fragments have accordingly discouraged children from beginning sentences with co-ordinate connectives. They have apparently been most successful.

With only four exceptions the girls attained higher percentages on the Written Connectives Test items than did the boys. The notable exception was in grades five and six where the boys from small towns consistently did better than the girls.

In fourteen of the twenty items there was a development in the students' ability to read the item and write in an acceptable answer, from a lower grade to a higher one.

SUMMARY

When the Connectives Reading Test was compared with the Written Connectives Test the over-all percentages of acceptable answers were very close but from grade to grade a trend appeared to

develop in which children did better on the Connectives Reading Test than on the Written Connectives Test.

The three factors of sex, grade, and population strata (by place of residence) again appeared to be significant factors on this test. The girls consistently obtained higher marks than the boys on the Written Connectives Test and students in a lower grade lagged behind those in a higher grade in achievement. Children in urban areas achieved higher scores than those in small towns, who in turn, did better than those in rural areas. However, upon further investigation the strength of the test performance of girls in rural areas and of boys in small towns was pronounced.

Among the individual connective items, test blanks which could have been acceptably filled with "although," "and," and "yet" proved as hard for students as they were on the Connectives Reading Test. Sentence structures communicating concession are apparently difficult for children at these grade levels. The students did not choose to use connectives such as "thus" but substituted suitable connectives more common in their speech.

CHAPTER X

FINDINGS: PATTERNS OF LANGUAGE DIFFICULTIES

The analysis of connectives in Chapter VI revealed that the items testing each connective had different comprehension levels signifying that some connectives were more difficult to understand in reading than others. This chapter will analyze the most difficult test items at each grade level to see some of the language features they have.

The study has shown that pupil understanding of connectives develops grade by grade and that the rate of development varies. The connectives then, can be ordered according to the difficulty students have in answering test items in which the connectives occur. There are however, several other words in the test items any one of which could with the connective, form part of a pattern of language difficulty for that test item. If by an analysis of some of the language features of the items the students found most difficult on the _Connectives Reading Test_, recurring incidence of certain language features could lead to the identification of possible patterns of language difficulties, more would be known of the reasons why students have problems in reading comprehension. It was for the identification of patterns of language difficulties that the most difficult test items of the _Connectives Reading Test_ were analyzed.

The three sections of the chapter will discuss first, possible problems with the use of the connectives themselves, then, problems related to clauses with which connectives are so vital a part, and lastly, problems associated with entire sentences and connectives in them.

The concern of this chapter then, is with the test items which students found most difficult to understand on the _Connectives Reading Test_. These test items were taken from the stories of basal readers and they indicate what sentence structures children found difficult in reading that material. The test items do not necessarily contain sentence structures which children would find the most difficult in other reading material or in their speech.

The subject of clause dependency provides an example. From the basal reader sample, it was found that 75 per cent of the sentences containing connectives had one connective (Chapter III, page 69). It is reasonable to expect then, that sentences with one dependent clause would be more numerous in the test items than sentences in which one clause was nested within another one. In completing the _Connectives Reading Test_, children read many more first-order dependent clause sentences than second-order and they had more opportunity to make errors in understanding. From the analysis of the most difficult test items, it appears that the children did have difficulties with these first-order dependent clause sentences. This does not mean that these clauses are more

difficult than second-order dependent clauses. It does mean that in the sentences of the basal reader sample used in this study, children in grades four to six had trouble reading some of the first-order dependent clauses. The purpose of this analysis of the most difficult test items then, is to attempt to find out what combination of language features these sentences and others may be contributing to the difficulties children are experiencing in reading.

No claim is made that the presence of a language feature implies that it is singly or in combination a cause of the reading difficulties children have with the test items, although it may be.

The item analysis program assigned a difficulty index to each test item. A three place decimal number, the difficulty index showed how many students in a thousand would answer the test item correctly. For example, a difficulty index of .483 means that of every 1,000 students attempting to answer a test item, 483 would answer correctly. The lower the difficulty index was, the fewer the students were who correctly answered the test item.

The 150 test items of the _Connectives Reading Test_ were first ordered according to their difficulty indexes and then grouped. Each group of test items had a difficulty index range of .100. The group of test items with the lowest difficulty index range for the total test group was .300 to .400. Any test item,

then, which 300 to 400 students in 1,000 could answer correctly, was placed in this group.

The two lowest difficulty index ranges were set out for the total test group (grades four to six) and for each grade. They are given in Table LI together with the number of test items in them.

TABLE LI

DIFFICULTY INDEX RANGES OF THE MOST DIFFICULT TEST ITEMS OF THE CONNECTIVES READING TEST

Grade	Difficulty Index Range and the No. Test Items in Range for: Most Difficult Test Items (Class A) Range:	No. Test Items in Range:	Second Most Difficult Test Items (Class B) Range:	No. Test Items in Range:	Total No. Items
4-6	.300 - .400	6	.400 - .500	13	19
4	.200 - .300	5	.300 - .400	16	21
5	.300 - .400	7	.400 - .500	11	18
6	.400 - .500	7	.500 - .600	15	22

The test items were not of equal difficulty to students in different grades so the two lowest difficulty index ranges vary from grades four to six. The most difficult test items in grade four were in the difficulty index range of .200 to .300. However, in grade five

the most difficult test items were in the range .300 to .400, and in grade six, .400 to .500. Even though the test items were not of equal difficulty to students in the different grades, the test items of Classes A and B (Table LI) represented at least 75 per cent of the same items which students in each grade found hardest to understand in reading.

Test item no. 87 on the Connectives Reading Test (Appendix A) which tested the connective "although" provides an additional example. This test item had a difficulty index of .383 for the total test group. In grade four, however, the difficulty index was only .284 indicating that younger students found the test item much harder to understand in reading. In grade five, the difficulty index rose to .381 and it was .485 for grade six students. Even though each grade group gave a different difficulty index for this test item, the item itself was one of the most difficult test items in each grade. In grade four, the "although" item was the second most difficult, in grade five, the sixth most difficult and in grade six, the seventh most difficult item. Therefore, in spite of the fact that the difficulty of the "although" test item varied from grade to grade, this item was identified as one of the most difficult to read by all students, regardless of grade level.

In the first analysis of all test items to identify patterns of language difficulty, all test items were included not just those that were judged to be most difficult for students to read. After

graphing the various language features of the 150 test items no definite over-all pattern emerged. There were, however, some interesting language patterns among test items of the two lowest difficulty index ranges so the information was retained for this chapter. Table LI gives the exact number of items in these two ranges, for the total test group and for each grade group. The total number of test items designated as the most difficult was approximately twenty but the number varied as no one could predict how many items each grade group would find most difficult in that particular index range. In this chapter the test items in the lowest difficulty index range for each group will be called "the test items of Class A" while those in the second lowest difficulty index range will be called "the test items of Class B."

The same areas of interest in language that were identified in Chapter One, pages 7-11, were investigated here. For example, questions of multiplicity of meaning and function of connectives, types of clauses, and absence or presence of phrases, verbals, or adjectives were among the language features investigated. Categories were chosen for each language feature studied, an illustration of which is clause type where categories of noun, adjective and adverb clauses were selected. Details concerning each category will be given with the language feature report.

After the formation of categories, each item in Classes A and B was examined and put into the category it fitted. Then the

total number of test items in each category was expressed as a percentage of the total number of test items in that difficulty index range. If there were, for instance, two adjective clauses in Class A in grade four, the percentage would be 40 per cent as two out of five test items in Class A in grade four had adjective clauses in them. Only by reporting the incidence of each language feature in per cents could comparisons be made because the number of test items in each difficulty index range varied from grade group to grade group.

I. PROBLEMS WITH THE USE OF THE CONNECTIVES

The section will discuss the frequency of appearance of connectives in the most difficult test items in sentences of the basal readers, spatial position of the connective in the item, multiplicity of meanings of connectives, and variety of functions of the connectives and their homographs. The graphs showing the four problems with the use of the connectives are in Figure 17.

Frequency of Appearance of Connectives

The first problem investigated was the frequency of appearance in sentences of the basal readers, of connectives which were found in the most difficult tests items of the *Connectives Reading Test*. That is, were the connectives that were most difficult to read those which occurred less frequently in stories children read?

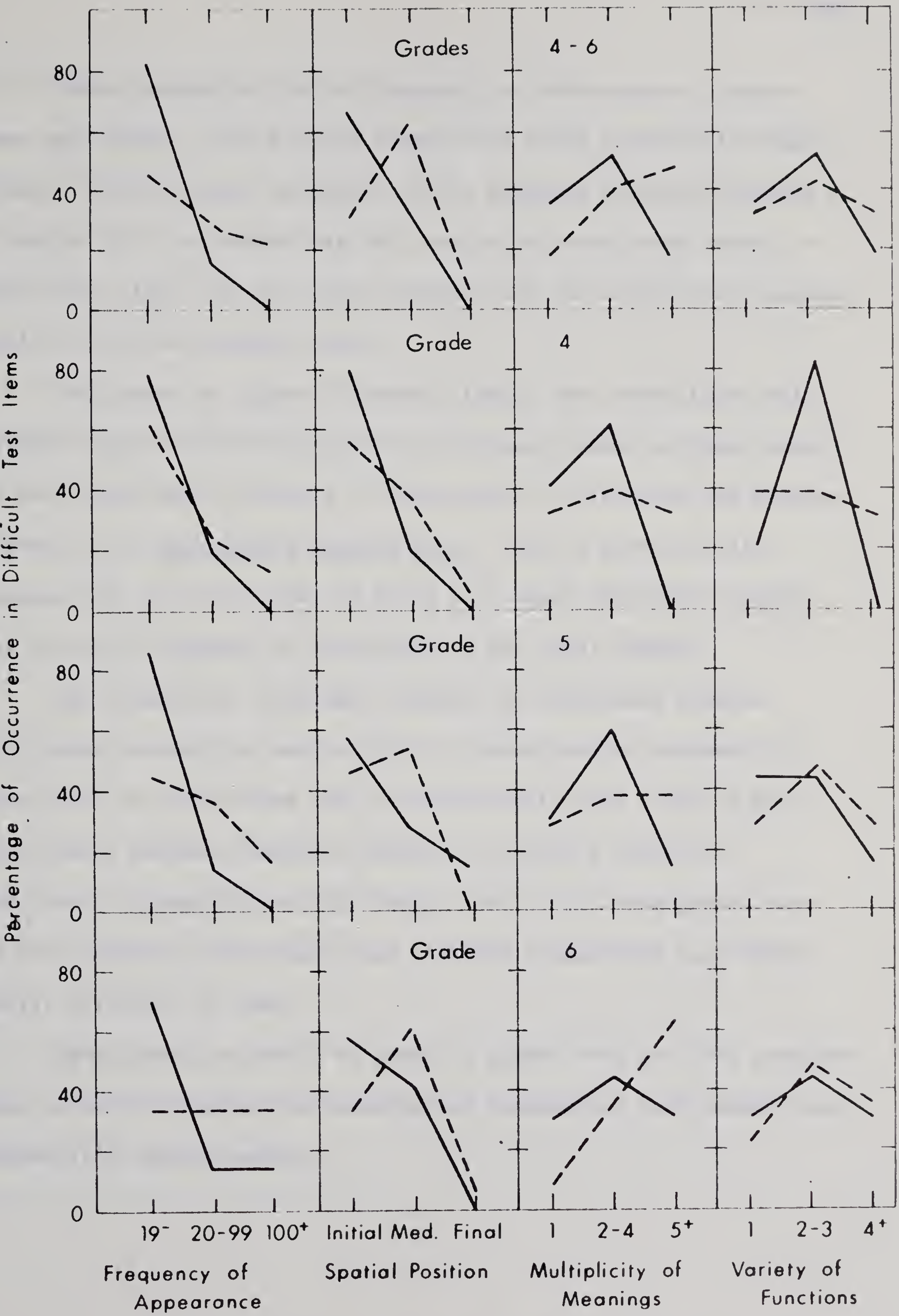

Fig. 17 PROBLEMS WITH THE USE OF THE CONNECTIVES

——— most difficult test items ---- second most difficult test items

Three categories for the frequency of occurrence of connectives were formed. One was for connectives which appeared 100 times or more in basal reader sentences in the sentence analysis reported in Chapter III; the second was for those which were noted twenty to ninety-nine times, and the third category was for those which appeared rarely, less than nineteen times.

The graphs in Figure 17 showed clearly that connectives which occurred less than nineteen times in the basal reader sentence analysis were those which students in grades four to six found the hardest to read in the Connectives Reading Test. Only in grade six did students find the test items of Class B of equal difficulty regardless of their frequency of occurrence in the basal readers.

The connective "although" provides an additional example. This connective was the most difficult connective for students in grades four to six to read and it occurred only five times in the basal reader sentence analysis reported in Table X, page 86, each time in grades four or five books. Yet it is these grades four and five students particularly who find the connectives that occur rarely, difficult to read.

Some attention should be given to grades four and five students then, to help them grasp the meanings of connectives that appear less frequently in basal readers.

Spatial Position of the Connective in Test Items

To assign connectives to the initial, medial, or final positions in test items, the number of words in the items was counted, including only one alternate answer, the correct one. Then the total number of words in the test item was divided by three thereby assigning the initial position in the sentence to the connective that appeared in the first third of the sentence. The medial position was given to the connective occurring in the second third of the sentence, and the final position to a connective in the last third of the test item.

For the test items of Class A, the initial position in the sentence characterized the connectives being tested while the test items of Class B were found more often in the medial position, especially in grades five and six. A connective in final position in the sentence apparently does not present the same difficulty to students in reading, perhaps, because the information given in the clause can at that point in the sentence be added more easily to the information already acquired. It may be true also that sentences in readers may be longer on the average for students in grades five and six. If this is so, the combination of longer sentences and the interruption of the main clause by a connective with its clause in medial position could present problems to students in reading comprehension.

Multiplicity of Meanings of the Connective (Table XI - page 90)

In grades four and five, connectives which have two to four meanings were found more often in the test items of Classes A and B than connectives with only one meaning or with more than four meanings. In grade six the connectives with five or more meanings were decidedly a characteristic of the test items of Class B. The multiple meanings of connectives, then, appear to hinder student comprehension of connectives. Instruction in vocabulary development should draw the attention of students to the variety of meanings which connectives can have so students are aware of differences in meanings.

Variety of Functions of the Connective and its Homographs (Table XII, page 94).

The middle humps of the graphs were pronounced indicating that connectives and their homographs which represented two to three different functions as set out in Table XII, posed a problem to student reading comprehension in the three grades. In grade four particularly, connectives which have two to three homographs occurred more often in the test items of Class A than connectives which had no homographs. It is logical that children would find connectives with multi-meanings and multi-functions difficult to understand so it is apparent that children need opportunities to discuss connectives so that adequate concepts of meanings and functions can be developed.

II. PROBLEMS RELATED TO THE CLAUSES AND THE CONNECTIVES

Two different sets of language features were investigated in this section. One set concerned language features of length, dependency, and function in clauses. The other set noted the presence of language elements within clauses such as phrases, adjectives, verbals, and words indicating negation. The graphs for each set of language features of the clauses are in Figures 18 and 19.

Clause Length

The formation of categories for clause length was based primarily on the work of Hunt[1] who reported that grade four children wrote clauses with an average length of 6.6 words while students in junior and senior high school averaged 8.1 to 8.6 words long. One category was formed then, with clauses that had eight words or less in them and the second category, those with nine words or more.

In grades four and five the majority of test items of Class A in the Connectives Reading Test were those which contained nine or more words while in the test items of Class B, the percentages gave

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[1]K. W. Hunt, "A Synopsis of Clause-to-Sentence Length Factors," The English Journal, Vol. 54, No. 4, April, 1965, pp. 300-309.

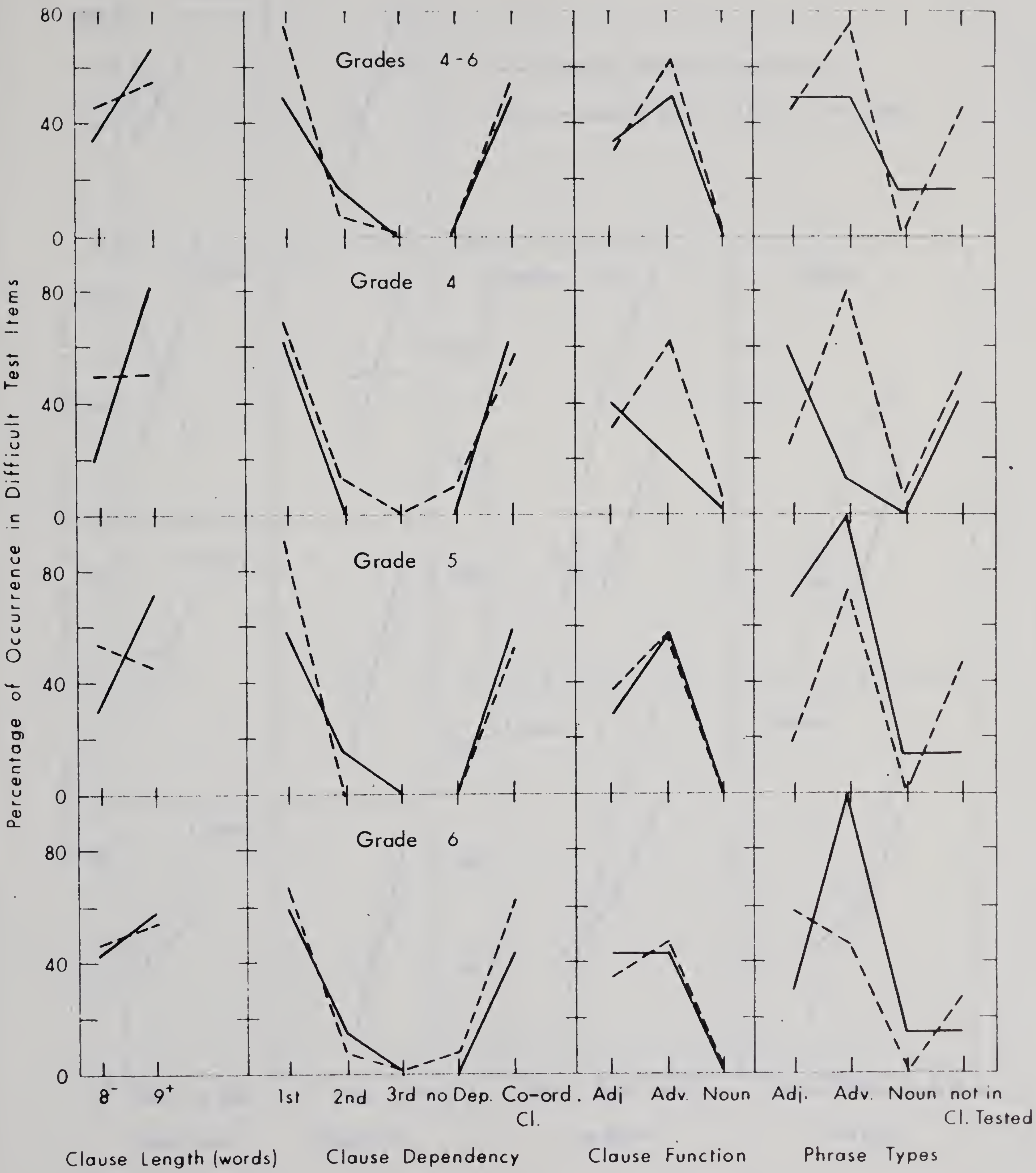


Fig. 18 PROBLEMS WITH CLAUSES AND CONNECTIVES

——— most difficult test items ---- second most difficult test items

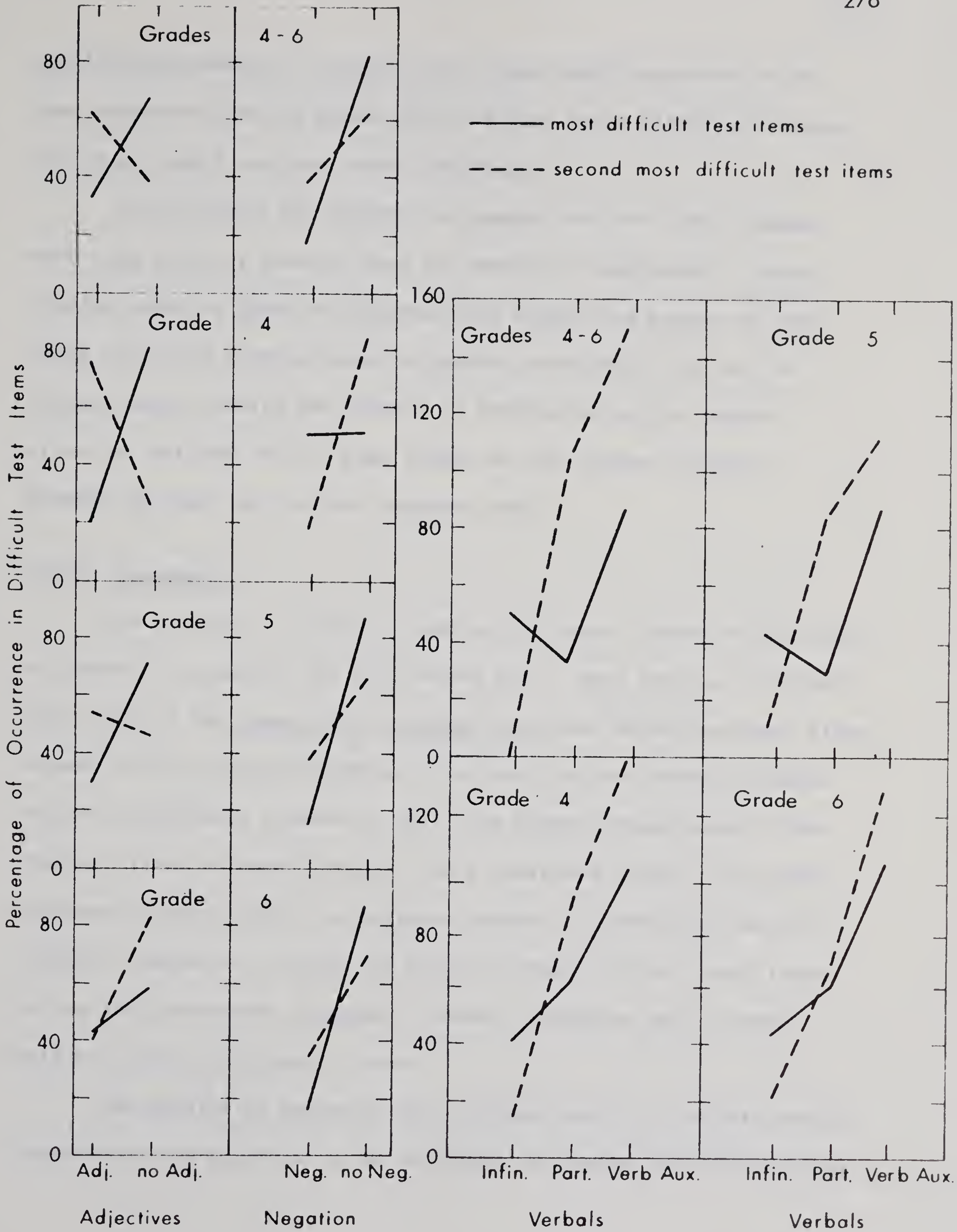
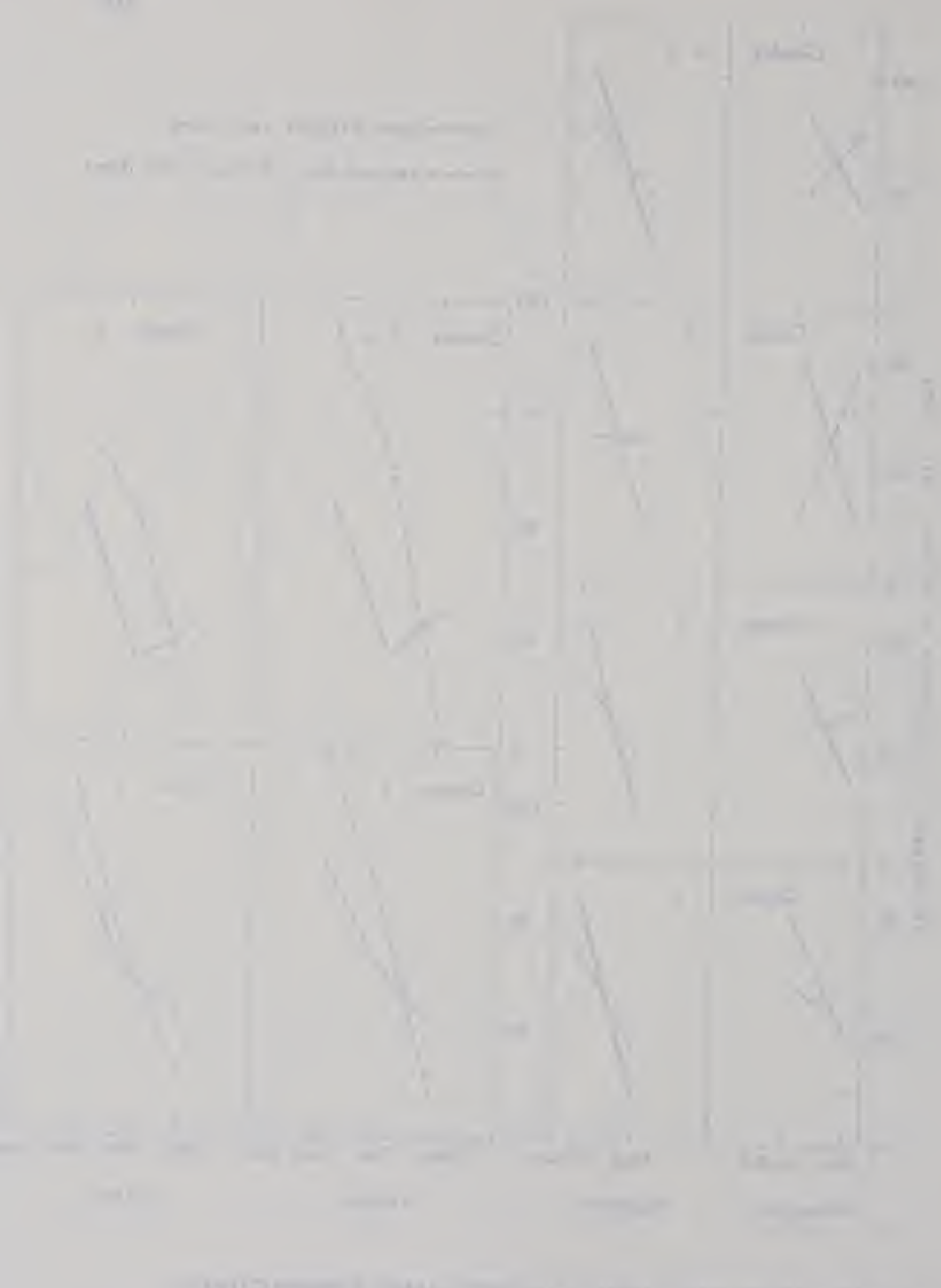


Fig. 19 PROBLEMS WITH CLAUSES AND CONNECTIVES



conflicting results. In grade six, clause length appeared to be less important than in grades four and five but a different division of clause length may have shown otherwise.

Particularly for students in grades four and five, clauses with nine words or more in them are harder to understand. Should reading material given to children stay within the bounds of that which the child produces when he speaks or writes? That is, in clause length, should the clauses in reading materials others write for children be the same length as the clauses children produce in their own written language work?

Clause Dependency

The problem of clauses found within other clauses as described in Chapter I, page 10, was the concern here. Were the most difficult test items of the Connectives Reading Test those which contained first, second, or third-order dependency? Or were they co-ordinate clauses and not subordinate clauses at all? The graphs showed clearly that the test items in both Classes A and B contained either first-order dependent clauses and/or co-ordinate clauses. Apparently, the co-ordinate clauses are present in almost as many difficult test items as are the first-order dependent clauses. Children seem to need help with the conjoining of ideas.

The problem of understanding a clause when it is within another clause does not appear to be as difficult in reading for the children

who completed the Connectives Reading Test. It is emphasized though, that there were comparatively few second and third-order dependent clauses in the sample of sentences taken from the basal readers and, therefore, comparatively few items in the Connectives Reading Test containing them. If there had been equal numbers of first, second, and third-order dependent clauses in the test items, more reading comprehension problems may have emerged in the latter two.

Clause Functions

Clause function indicates here the part of speech which the clause assumes, adjective, adverb, or noun. From the graphs it is apparent that clauses functioning as nouns in test items were not difficult for children to read in the Connectives Reading Test. Both adjective and adverb clauses, however, are present in appreciable numbers in the test items of Classes A and B. Of the two, adverb clauses had a higher percentage of occurrence. It was noted in Chapter II that when children wrote, they used time and cause subordinate adverb clauses in their stories. Reference to Table XXXI, page 189, will show that for the total test group only three connectives in the test items there, contained connectives of time and cause. The other adverb clauses in Table XXXI involved other functions of the clause

such as condition, concession, drawing of conclusions, and place, clauses which Harrell found rarely in children's oral and written language.[2]

Reports in Chapter II, page 39, also stated that children had difficulty with the adjective subordinate clauses in their own speech and written language because, by their position in the sentence the clauses often interrupted the thought of the main clause. Children apparently need help to understand both adjective and adverb clauses.

Phrase Types

In this section a phrase is defined as a group of words introduced by a preposition and functioning as a noun, adjective, or adverb in the sentence.

The phrases were first divided into two categories, those inside the clause containing the connective being tested and those outside. It had been observed during the sentence analysis as described in Chapter III, page 99, that many of the phrases were three or more words long. As these words would add considerably to clause length which is a critical factor in language development according to Hunt,[3] one category was set aside for the analysis of phrases

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[2]Lester E. Harrell, Jr., "A Comparison of the Development of Oral and Written Language in School-Age Children," Monograph of the Society for Research in Child Development, Inc. (Ohio: The Antioch Press, 1957), Vol. XXII, No. 3, p. 57.

[3]Hunt, op. cit., pp. 306-309.

inside clauses. Three sub-categories were formed for these phrases, adjective, adverb, and noun. The test items of Class A contained fewer phrases outside the clause containing the connective being tested, than did the test items of Class B. Inside the clauses, adjective phrases were present in about 20 - 70 per cent of the test items of Classes A and B. Adverb phrases were present in about 40 - 100 per cent of the test items. The noun phrases do not appear more than 15 per cent of the time in the test items of Class A and only rarely in Class B items. Both adjective and adverb phrases, however, appear to be a language feature in the clauses of the most difficult test items.

<u>One-Word Adjectives</u>

To answer the question of whether the most difficult test items had one-word adjectives in them, two categories were formed. One was for the presence of adjectives in the most difficult test items, and the other, for their absence. An interesting but contradictory pattern appeared, for in the test items of Class A for grades four and five, there were only 20 - 30 per cent of the items with adjectives, but in the test items for Class B in the same grades, about 55 - 75 per cent had adjectives. In grade six, the test items for both Classes A and B showed that the greater percentage of the test items contained no adjectives.

In the three grades, four to six, adjective phrases and

clauses appeared to be language features of the most difficult test items, but not always one-word adjectives. The situation may be accounted for by the fact that both the adjective phrases and clauses have positions in the sentence following the words they modify, necessitating the holding of information already read while the meaning of the phrase or clause is added. The one-word adjectives, on the other hand, precede the words they modify and therefore, may not hinder reading comprehension by requiring the holding of information from a main portion of the sentence while a phrase or clause is read and the information from it, added to main clause.

Words of Negation

The difficult test items were placed in one of two categories, the presence of words of negation or their absence. Words such as "not, n't, never, and no one" were among those which were counted in the test items as expressing negation but sentence structures such as "he hardly ever sees him" were not counted.

Test items in which there was an absence of words of negation outnumbered their presence in the items of Class A by about seven to one suggesting that these words may not be a language feature which needs to be included in possible language patterns of difficulty in reading.

Verbals and Gerunds

The presence of verbals and gerunds in the difficult test items was investigated to find out their relative frequency of occurrence. Infinitives were found in up to 50 per cent of the test items of Classes A and B but the participles and verb auxiliaries occurred with a frequency ranging from approximately 2 in every 3 of the test items of Classes A and B to 1-1/2 in every test item. The gerunds did not appear in any of the most difficult test items.

III. PROBLEMS ASSOCIATED WITH THE SENTENCE AND THE CONNECTIVES

The number of connectives in test items, the length of sentences, and the presence of impersonal constructions in sentences, will be discussed first in this section with the graphs in Figure 20. A brief report on sentence format, the voice of verbs and the discourse of sentences in difficult test items will follow.

Number of Connectives in the Sentence

The test items were placed in one of three categories: sentences with one connective, those with two connectives, and those with three or more connectives.

With the exception of one instance in grade four, 40 - 80 per cent of the test items in Classes A and B contained only one connective. Test items with two connectives in them always maintained at

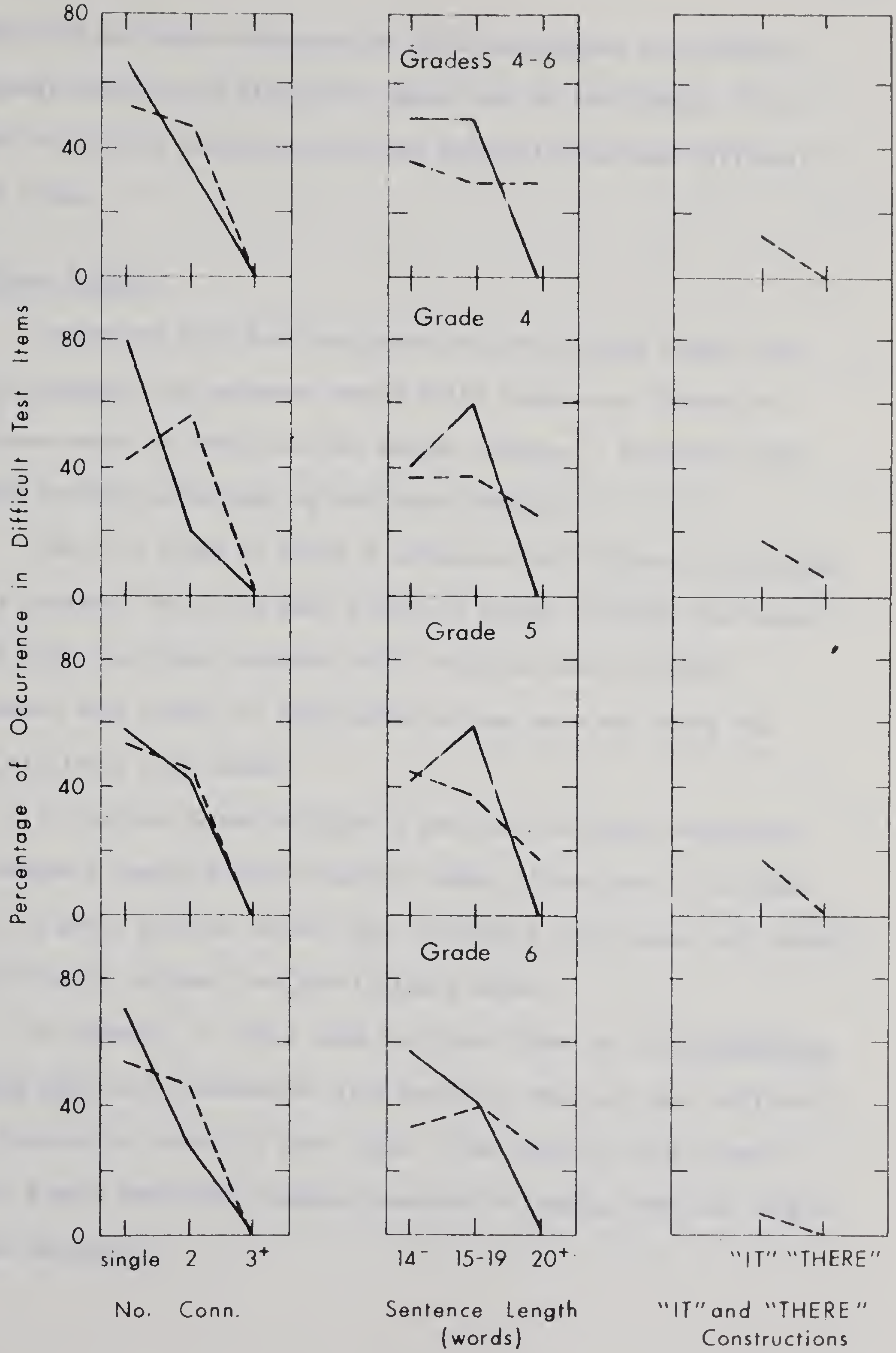

Fig. 20 PROBLEMS OF SENTENCES CONTAINING CONNECTIVES
——— most difficult test items ---- second most difficult test items

least a 44 per cent occurrence so their importance in possible language patterns of difficulty should not be overlooked. The three connective test items did not appear in the most difficult test items.

Sentence Length

Sentences with fourteen words or less in them formed the first category for sentence length while those with fifteen to nineteen words in them were the second category. Sentences with twenty or more words made up the third category.

The test items of Class A sentences with fifteen to nineteen words appeared to be the most difficult except in grade six where those with less than fourteen words were the most difficult. Sentences with twenty or more words in them were not among the most difficult test items.

In the test items of Class B each of the three categories for sentence length differed only by about 20 per cent. The incidence in grade four of 30 per cent of Class B test items with twenty or more words in them, was particularly noted.

In general, it would seem that test items of the Connectives Reading Test with nineteen or less words in them are more difficult than those with twenty or more words. The length of the clause may be a more important language feature in reading than the length of the sentence.

Impersonal Sentence Constructions

No sentence constructions with "there" appeared in the test items of Classes A and B except for a 6 per cent occurrence in grade five. The sentence construction of "it," however, appeared in approximately 20 per cent of the test items of Classes A and B. Further investigation in another study may prove that the impersonal "it" sentence construction may be difficult for children in reading especially in grades four and five.

Sentence Format, Voice of the Verb, and Sentence Discourse

The test items of Class A were almost completely assertion sentences in indirect discourse form with active voice verbs. There was so little variation from grade to grade that the graphs for Classes A and B were not presented.

In the investigation of sentence format the imperative sentences in grade six represented about 6 per cent of Class B test items. Otherwise, all sentences in Classes A and B were assertion format.

Direct discourse was noted in about 20 per cent of the sentences of Class B in grade six, and in about 6 per cent of Class B test items in grade four, but in grade five, the sentences in Class B were almost entirely indirect discourse.

The verbs in the test items of Classes A and B at the three grade levels were about 20 per cent passive voice and about 80 per cent active voice. Grade four and five students showed that about

18 per cent of the verbs had passive voice in their most difficult test items and only about 10 per cent of the verbs in the most difficult test items at the grade six level had passive voice.

Some of the language features discussed in this sub-section may be found upon further investigation to contribute to the difficulties of the language patterns children read.

SUMMARY

In this chapter the most difficult test items of the Connectives Reading Test, about 20 items at each grade level, were analyzed in an attempt to identify possible patterns of language difficulty in reading comprehension.

The analysis showed that test items which the children found the most difficult to understand in reading are likely to have the following language features:

1. The connectives will occur least frequently in basal readers and they will have more than one meaning. The connective and its homographs will represent more than one function.

2. The clause in the test item will probably have nine or more words in it, and it will be a first-order dependent clause or a co-ordinate clause. The dependent clause will be either an adjective or an adverb clause with the majority of the adverb clauses featuring condition, concession, or place, rather than cause or time.

3. Fifty per cent of the phrases in test items will be located outside the subordinate clause. Forty-five per cent of the clauses will have adjective phrases in them, though, and about 75 per cent of them will have adverb phrases.

4. One-word adjectives and words expressing negation are more likely to be absent in the difficult test items, while participles and verb auxiliaries will often be present.

5. The greater per cent of test items will contain one connective but nearly half of the items will have two connectives.

6. The sentence is most likely to contain between fifteen and nineteen words and about 20 per cent of the sentences will have an "it" construction.

7. The sentences are almost certain to be assertion in format, in indirect discourse, and with about 80 per cent of the verbs having active voice.

These language features of the most difficult test items in the Connectives Reading Test when combined with what this study has shown about the connectives in the test items, may give educators some indication of what the possible patterns of language difficulties the basal readers may have for students in grades four to six.

CHAPTER XI

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Students in the upper elementary grades are often required to read sentences which have co-ordinate and subordinate ideas in them but very little is known about the problems which these sentence structures may present to them in reading. The purpose of this study, therefore, was to investigate the understanding in reading which children aged eight to twelve studying in grades four to six, have of connectives, the linguistic form which connects a clause to another clause or some word in it on the printed page.

The four sections of the chapter will present a brief summary of the study, the findings and conclusions, certain limitations of the investigation, some suggestions for further research, and a number of educational implications arising from the study.

I. SUMMARY OF THE STUDY

The study was divided into three parts in an effort to explore the student's reading comprehension of connectives. The first part analyzed stories of the basal readers to identify the connectives present and the type of sentence structures in which they are often found. The second part of the investigation then proceeded with the construction of multiple-choice test items containing selected connectives in the sentence structures of the basal readers. The

administration of the test and the processing of data collected according to selected statistical techniques constituted the third part of the study.

Of the sample of 2,587 sentences drawn from three sets of basal readers, 957 sentences contained 1,268 connectives. The 77 phrasal connectives were deleted, retaining the 1,191 one-word and "absent" connectives for the study. They represented 42 different connectives from which 17 were chosen representing the classes and sub-classes of the subordinate, co-ordinate connectives, sentence linkers, and "absent" connectives.

The sentences containing the seventeen connectives were analyzed using a modified structural grammar approach to identify sentence patterns from which the test items were constructed.

The Connectives Reading Test consisted of 150 multiple-choice items each with four alternate choices, patterned so an investigation of errors as well as correct answers could be made. The test items used the connectives singly and in combination, requiring students to select the answer which best filled the blank following the connective.

Using some of the same sentence patterns as the Connectives Reading Test, a Written Connectives Test of twenty items was also constructed in which students completed sentences where only the connective was missing. The results were then compared to those of the Connectives Reading Test but no statistical tests were applied.

After reliability and validity of the Connectives Reading Test had been established in a pilot study, the test was administered to 402 children in Alberta, constituting a random sample of grade four, five, and six students, stratified according to their places of residence in urban, small town or rural areas.

The data collected were processed by a number of statistical techniques including item analyses, analyses of variance and covariance, and computation of correlations. The seven covariants were: sex, mental age as represented by student achievement on the SCAT Test, chronological age, socio-economic status rated by the Blishen Occupational Class Scale, and listening, reading, and written language abilities assessed by the appropriate STEP Tests. The findings of these analyses are noted in the next section.

II. FINDINGS AND CONCLUSIONS OF THE INVESTIGATION

The study identified a number of areas of the problem of student understanding of connectives. These are summarized below according to the null hypotheses and the general findings and conclusions.

Null Hypotheses

Null Hypothesis 1.

> There is no significant relationship between the understanding a child has of connectives and:

a. sex

b. mental age

c. chronological age

d. socio-economic status

e. listening ability

f. reading ability

g. written language ability

Statistical analysis showed that with the exception of chronological age and socio-economic status, each of these variables exerted significant effects upon the total test scores of the students on the Connectives Reading Test. The hypothesis, except for chronological age and socio-economic status, is rejected.

The two sections of the SCAT test, verbal and non-verbal, were correlated with the Connectives Reading Test separately and it was found that together with the three STEP Tests they predicted more than four-fifths of the variance of the Connectives Reading Test. It appears that there is a common language factor in all these tests which affects the understanding of children in reading. As a connective was common to each of the test items in the Connectives Reading Test, it is logical to conclude that the presence of this element would be a part at least of the language factor at work in each test.

Streaming practices in the upper elementary grades enable students with good mental ability to advance more rapidly through

the grades so the factor of chronological age was non-significant. Reading comprehension is closely linked with thinking processes, and the greater predictability of the factor of mental ability rather than chronological age is acknowledged.

The sex factor indicated that boys have a general language lag in grades four and five. This lag was especially prominent in rural areas. The boys' scores were almost always below the girls'. Place of residence emerged as a strong factor singly and in its combined effects with grade and sex.

The failure of socio-economic status as a variable affecting test scores in this study may be explained by the increasing mobility of occupational groups, giving them more ready access to the wide array of cheaper reading materials which characterize our times. Larger school administrative units have also been able to provide better learning facilities and better trained teachers. Moreover, the inadequacy of the Occupational Class Scale to reflect socio-economic levels accurately, coupled with the apparent affluence of this sample (only one example of welfare) may have affected the finding in this respect.

The lack of adequate representation in the higher achievement groups of the Connectives Reading Test, of children whose parents are in the managerial groups of the middle class may indicate that these children are too concerned with the technological products of our affluent society with a resultant neglect of the printed page.

Null Hypothesis 2.

> There is no significant increase in the pupils' understanding of connectives from grades four, to five, to six.

The study revealed that for each grade group the understanding of test items representing the total test and the seventeen connectives at the three grade levels, increased from grade to grade.

The analyses revealed further that each connective had its own comprehension level with no two of the seventeen connectives registering the same percentage of understanding at any grade level, the differences often amounting to 30 per cent.

Null Hypothesis 2, then, is not accepted. Grade is a highly significant factor and the students do develop in their understanding of each of the seventeen connectives from a lower grade to a higher grade.

It was also shown in the informal analysis of the Written Connectives Test that for fourteen of the twenty connectives, there was a progression in understanding from grades four to six.

When the sentences in the basal readers were analyzed, it was apparent that the percentage of connectives in them varied negligibly from one grade to another. Writers of basal readers appeared to have concluded that students in grade four have reached a satisfactory level of understanding of connectives, that there is no development of understanding from grade four upwards, and that there is no need to control the introduction or use of connectives in any way. This investigation has shown otherwise.

Null Hypothesis 3.

> There is no significant difference in the rate of development of the pupils' understanding of different connectives.

From the analyses it was evident that the development of students' understanding of connectives proceeded at a different rate for each of the seventeen connectives. Not only were there different beginning levels of comprehension in grade four but the developmental rates from grades four to six varied also. The analyses of connectives showed that for the students in the higher achievement groups of the Connectives Reading Test, the greater growth in understanding came between grades four and five. With the students in the lower achievement groups of the Connectives Reading Test, the greater growth of understanding came between grades five and six. As the students who are high achievers in the Connectives Reading Test are also high in mental ability, it is evident that there is a close relationship between the understanding of different connectives and mental ability.

The null hypothesis, therefore, cannot be upheld. There are significant differences in the rate of development of the students' understanding of different connectives.

In the results of the Written Connectives Test it was noted that with the exception of boys in grade five in small towns, the greater growth in ability to write connectives came from grades five to six. As writing connectives in this test included the added burden

of reading the test items first, the later development is reasonable for the two-fold task.

The rate of development of understanding is different from one connective to another and it varies also from students in higher achievement groups of the Connectives Reading Test to those in lower groups.

Null Hypothesis 4.

> There is no significant variation in the pupils' understanding of a connective within each grade.

When the students were divided into five achievement groups according to their test scores on the Connectives Reading Test, the investigation indicated that most of these group means were significantly different one from the other. It can be concluded, therefore, that there are at least five reading achievement levels within each grade. Accordingly, the null hypothesis is not upheld.

The analysis further confirmed that within any one of the five achievement groups the same development of understanding of connectives could be traced from grade four to six as reported in connection with null hypothesis 2.

The achievement groups representing the highest and lowest achievers had the least number of non-significant differences between their means and the means of other groups. This indicated that the spread of achievement was comparatively wide because students who comprehend the best are well ahead of students in the second highest

achievement group while those whose reading comprehension is very poor are so poor that their means differ significantly almost always from those in the second lowest achievement group.

Null Hypothesis 5.

> There is no significant relationship between the pupils' understanding of a connective and the type of errors he makes as he reads.

The study showed that there was a consistent relationship between the students' understanding of a connective and their answers on the items testing that connective. As students developed in their ability to understand connectives in reading by grade, the number of correct answers on test items increased. Commensurate with this increase a pattern of errors which suggested increasing semantic awareness of the connectives was noted.

Three types of errors maintained a consistent relationship among themselves. The research hypothesis stated that partial student understanding would be indicated by either grammatical or situational errors with a wrong connective answer showing no understanding of the connective. It was expected that the order of frequency of occurrence of errors would be first grammatical, then situational, and finally, wrong connective answers. At each grade level the grammatical answers were the most frequent type of error but the wrong connective rather than the situational error, was next in frequency of occurrence. This pattern of errors was maintained throughout each analysis of connectives. Not only did

the relationships between correct answers and errors hold from grade to grade, but within a grade each of the five achievement groups showed the same pattern of errors. The lower frequency of occurrence of situational errors could be accounted for in the exaggeration of situations to prevent ambiguity in the alternate answers of test items.

The null hypothesis cannot be accepted. The child's development of understanding of a connective can be seen by the type of errors he makes on the items testing that connective.

General Findings and Conclusions

A number of findings and conclusions are presented in this section under the headings of student comprehension of connectives, strength of connective relationships, the common factor in the Connectives Reading Test, effects of grade, sex, and population strata on the student comprehension of connectives, and patterns of language difficulty.

Student Comprehension of Connectives. The total student group in grades four to six understood 66.58 per cent of the sentences which had connectives in them. The understanding level rose from the lower to the higher grade, with the level of understanding in grade four 57.29 per cent, in grade five, 65.99 per cent, and in

grade six, 74.72 per cent. Smith[1] and Austin et al.,[2] have advocated that at an instructional level a comprehension level of 70 - 75 per cent is essential for the student. Spache[3] maintained that a minimum comprehension level of 60 per cent was more realistic. The basal reader stories are materials used at an instructional level so it would seem that the student comprehension reading level in both grades four and five is too low. For independent reading materials such as textbooks in the fields of science, social studies, and literature where there may be very little reading instruction, this comprehension level is very low, even at grade six.

In grades four to six, student achievement in the connective classes of sentence linkers only, fell below the over-all comprehension level of 66 per cent. The same pattern of difficulty persisted within each grade. In the other connective classes, comprehension levels were never more than one to two percentage points below the over-all comprehension for the grade on the Connectives Reading Test. By connective class, the comprehension problem appears to center on sentence linkers.

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[1]Nila Banton Smith, Graded Selections for Informal Reading Diagnosis, Grades 4 Through 6 (New York: New York University Press, 1963), p. xiii.

[2]Mary C. Austin, Clifford L. Bush and Mildred H. Huebner, Reading Evaluation, Appraisal Techniques for School and Classroom (New York: The Ronald Press Company, 1961), pp. 14-15.

[3]George D. Spache, Reading in the Elementary School (Boston: Allyn and Bacon, Inc., 1964), p. 246.

Of the seventeen individual connectives, six had comprehension levels below the 66 per cent acquired by the total test group in grades four to six on the Connectives Reading Test. In addition to the two sentence linkers, "however" and "thus," the other four connectives were "although," "which," "and," and "yet." As five of these connectives attracted attention at several points throughout the analysis, a brief report about each one will be given.

The connective "although" appeared four times in the list of most difficult connectives in grade four, a number exceeded only by the occurrence of "thus" five times. It is difficult, apparently, for grade four students to understand situations involving concession. In the Written Connectives Test, items which used "although" in the basal reader sentences were among the four most difficult.

The connective "and" in addition to being one of the four most difficult test items to answer in the Written Connectives Test, combined with another co-ordinate connective "but," to account for nine out of the eighteen reversals of order of difficulty. That is, there were eighteen test items of the 150 items in which the normal progression of difficulty from a lower grade to a higher grade was disturbed. Nine of the items contained either an "and" or a "but." The students appeared to have encountered difficulties in conjoining ideas. The connective "but" forces the reader to reconsider the information he received in the first clause, and this could be one reason for student difficulties.

"Yet," together with both "however" and "thus" were the three connectives in which the percentage of wrong connective answers exceeded the grammatical error answers, indicating the difficulty which children have holding information units in reading while they consider other information given to them. The connectives "yet" and "when" were the only two connectives which had percentages of situational errors four to five per cent higher than the percentages for the situational errors of other connectives. "Yet" items on the Written Connectives Test were one of the four most difficult to complete.

The two sentence linkers, "thus" and "however," in addition to having a greater per cent of wrong answers than grammatical error answers, registered two of the lowest correlations with total test scores. In grades four and five, the connective "thus" accounted for 20 - 25 per cent of the most difficult items on the Connectives Reading Test. In the Written Connectives Test not one child used the word "thus" to complete a test item. "Thus" is a connective rarely used in the speech of students but it is retained in the more formal sentence structures of the printed page when a summary thought or conclusion is introduced after a logical argument has been presented. If the student does not understand the meaning of "thus," he may miss the argument presented in the preceding sentences.

"However" asks readers to consider an additional point in the presentation of a point of view. Children may have difficulty holding

information units while they consider the new material they are reading. Students need to be made aware of the reading problems which both these sentence linkers present.

When the twenty most difficult test items were ordered, 75 per cent of them were common to the total test group and grade groups as well. The degree of difficulty though, varied from grade to grade. For example, the most difficult test item for grade four students had a difficulty index of .250 in grade four, of .361 in grade five and of .478 in grade six. In grade five this item was the fourth most difficult and the sixth most difficult item in grade six, but in each grade, this test item was among the twenty most difficult to comprehend in reading.

The Strength of Connective Relationships. The correlations between the total test scores and the test scores for the items of each of the sixteen connectives were all high and positive as were the sixteen intercorrelations. The connective "thus" was an exception in each case. The correlations of the individual connective scores with the *STEP Reading Test* were not quite as high as those with the total scores of the *Connectives Reading Test* but it was apparent that there was a high positive correlation between the two tests, the *Connectives Reading Test* and the *STEP Reading Test*.

The Common Factor in the Connectives Reading Test. The factor analysis showed that the source of 63 per cent of the total variance in the *Connectives Reading Test* is apparently attributable to one

factor. Since each test item has a common factor of a connective in it, part of that factor could be a connective. The factor is also common to the three STEP and the two SCAT tests confirming that basically, the common factor in the Connectives Reading Test is a language factor.

The Effects of Grade, Sex, and Population Strata on the Student Comprehension of Connectives. As these three factors had marked effects singly and in combination upon the test scores of students, a more detailed report than was given in the discussion about null hypothesis 1 is included here.

Each of the analyses of connectives showed the positive effect of the grade factor upon the comprehension of connectives. In addition to the development of comprehension by grade reported earlier, there were a number of significant interactions of grade with both sex, population strata and test performance. Between grade and sex, the test analysis showed that for three of the co-ordinate connectives and for the conditional "if," there were significant differences between the test performances of boys and girls on the Connectives Reading Test in grades four and five. The boys lagged in performance behind the girls suggesting that boys may need extended help with these two sets of connectives.

The significant grade by test performance interactions for co-ordinate and simple includer connective classes came between the fifth and sixth years demonstrating that development of understanding

in grade four may be slower than it should be for these two groups of connectives. It still follows, however, that boys and girls would likely have trouble with the sentence linkers, but because both sexes have trouble with them, no significant differences between them would be recorded.

Sex was an important factor in the comprehension of connectives in grades four and five but not in grade six. The boys lagged behind the girls in the test items of the sentence linkers and some of the relative pronouns particularly. Therefore, in addition to the help needed to overcome a general language lag, the boys appear to need special help with the understanding of the connectives of particular connective classes.

The grade by population strata factor revealed that the place of residence provides a verbal environment for the students at particular grade levels such that development of understanding of connectives is affected.

In the _Written Connectives Test_ both the grade and sex factors appeared to be important also. Girls made better scores than boys with girls from rural and urban areas making strong showings. The test scores of girls in grade five from the small towns were lower than those of boys but the reverse was true in rural areas.

Patterns of Language Difficulties. Two research hypotheses were concerned with the multiplicity of meanings and functions of connectives. The informal analysis of language features of the

most difficult test items in the Connectives Reading Test showed that connectives in these items had more than one meaning and two to three different functions. Multiplicity of both meaning and function of connectives were features of the test items, students found hardest.

Other language features of clauses to which the connectives were attached, showed generally that deviations from the oral and written language students would use, were characteristics of the test items most difficult to read with understanding. For example, longer clauses than those students speak or write and which featured adjective clauses or adverb clauses of condition or concession, rare in children's language at this age, were characteristic features of the most difficult test items.

Summary

Each of the five null hypotheses of the study was not upheld and the general level of comprehension of connectives was considered to be too low for grades four and five. Six of the seventeen connectives investigated in the study showed particular difficulties, some of them because they were characteristic only of the printed page or because they had not yet become common in the speech of students. A strong interrelationship among the test items of various connectives was shown and possible patterns of language difficulties featured deviations of clause length and clause type from the language patterns which students would use in their own speech.

III. LIMITATIONS OF THE APPLICABILITY OF THE FINDINGS

In addition to the limitations set up at the beginning of the investigation three other limitations may restrict the applicability of the findings of the study.

The sentence analysis method using a modified structural grammar approach does not reveal the evolvement of various language structures found in the basal readers and therefore, cannot reveal more than a surface complexity of sentence structures or of the problems involved in pupil understanding of connectives in reading. Neither does the report of the incidence of certain language features in the most difficult test items, do more than acknowledge the presence of these features.

The increasing complexity of our technological society was not acceptably reflected in the Occupational Class Scale by Blishen. The impact of the socio-economic factor may be greater than the use of this scale can show. If the Blishen Scale could reflect the occupational classes better, the socio-economic factor might differentiate among students' achievement more effectively.

The extent to which situational type errors inhibit the comprehension of students and reflect the degree of understanding which students have, should be investigated further. The exaggeration of situations to prevent ambiguity in the test items did not permit adequate inquiry into the problems they may create in reading comprehension.

IV. SUGGESTIONS FOR FURTHER RESEARCH

The findings of this study have revealed a number of areas where further research is needed.

A study of the formal language of print should be undertaken to further identify differences between it and the child's own language in speech and written work. Particularly in the area of associating ideas using connectives, it should be known which connectives the children themselves use and the meanings they attach to the connectives. Changes of oral language occur faster than changes in print. Therefore, there are a number of connectives which are rarely heard in speech any longer but are still widely used in print. If this information about connectives were available, educators could make students aware of the language differences they tend to meet when they read what others have written.

The language of school texts other than the basal readers should be analyzed to find out what connectives they use when associating ideas. From present language usage surveys it is suggested that each subject area may use certain language structures in characteristic ways to communicate. These ways should be known to students so they can receive communications from texts better.

Connectives are only one language element in clauses. Thus, there should be an investigation of other language elements to find out how these elements change as the language of the child develops.

A comparison could then be made with the reading materials, and appropriate changes made in them so the language of print more nearly parallels the child's oral language.

Sentences conjoin and subordinate ideas in many other ways than by clauses and a study of these ways would give some indication of how sentences become more difficult for children to read. Readability formulae might then more accurately assess sentence complexity in reading materials.

Transformational grammar may well offer some of the best insights into some complexities of English and enable educators to gain essential understandings of how complex thoughts are communicated in language. If by further research the findings of this field could then be applied to the formal language of the printed page, a more accurate assessment of language structure complexity might be available.

Memory problems in reading, particularly those associated with the mental task of holding information units of one clause while additional information is gathered in another clause, should be investigated. Then educators and writers would be aware of possible hindrances of memory to reading comprehension.

A study of the students' knowledge of connectives in listening, speaking, and writing if undertaken, would provide teachers and writers of children's texts with knowledge of the background students usually have before they come to the printed page to read.

Investigations should continue to probe the interdependence of language and cognitive processes. If more could be known about how the mind processes the messages relayed by multi-clause sentences, educators would benefit from the information about the demands of formal language for a higher level of coding. Some of the connectives ask their readers to reconsider the information already read, in the light of the new information the connectives are introducing. These mental manoeuvres are very difficult, and understanding what is read becomes an exacting and intricate process. Although some of the connectives which cause children particular difficulties in reading have been identified, more needs to be known about the mental processes they stimulate.

V. IMPLICATIONS OF THE STUDY

A number of implications for the reading program and those concerned with its implementation may be derived from the findings and conclusions of the study. Some general implications will be presented first as the basis for some specific implications for teachers and supervisors of reading programs, teaching methods, and materials for reading.

General Implications

Since the reading comprehension level of students in grades four and five particularly as revealed by this study may be deemed

inadequate, it appears that the developmental reading program should intensify the systematic teaching of comprehension skills. Special provision could be made then for the development of understanding of connectives which are characteristic of the formal language of print or which have not yet become a part of the speech of students. Children have no way of finding out about specific differences of language such as the non-restrictive relative clause which is peculiar to print, unless they are incorporated into the teaching of comprehension skills of reading.

As student understanding of connectives develops from grade to grade at different rates for individual connectives, there is no plateau of understanding of connectives, and educators should both expect and aid the development of understanding of connectives in reading. Through stimulation of discussion with students about their errors in reading comprehension, teachers can ensure student awareness of their need to develop and refine their understanding of connectives.

The different rates of development of understanding among students for different connectives necessitate flexibility in the conduct of the reading program to accommodate to them. Also, boys appear to develop understanding for the connectives more slowly than girls in grades four and five, so additional adjustments in the reading program may be necessary especially in the rural areas.

There also appears to be a very close association of language, thought, and mental ability. Students who score low on tests of mental ability may need more help with the development of formal language structures which they need as vehicles for logical thought processes. On the other hand, students who score high on tests of mental ability should be systematically trained in an earlier grade in the formulation, manipulation, and use of language structures which they need in the logical thought processes for problem solving.

As students develop in their understanding of connectives in reading, it follows that development of understanding should be expected too in student knowledge of connectives in listening, speaking, and writing. Systematic training in any one of these three may help students in their understanding of connectives in print.

Ruddell's work strongly suggests that the closer we can come to the use of high frequency patterns of oral language in reading materials, the greater reading comprehension will be.[4] Should attention be given first to the child's oral language patterns to develop them further and the language patterns of print be made to follow the oral language patterns more closely? Or should there be a conscious

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[4]Robert B. Ruddell, An Investigation of the Effect of the Similarity of Oral and Written Patterns of Language Structure on Reading Comprehension (unpublished Doctoral dissertation, Bloomington: School of Education, Indiana University, 1963).

attempt on the part of educators to train the child in the formal written language patterns as well as developing his oral language patterns, thereby allowing both forms of language to develop side by side? It would seem an impossible task to ask writers of children's texts to revise their products so the better plan seems to be to give increased attention to the language of print and through systematic training make the child aware of this form of his language so he can use it as an effective means of communication.

Teachers and Supervisors of Reading Programs

There are many forms of English, formal and informal, oral and written. A functional knowledge of all of them is important to students to meet their communication needs.

Educators who have a good understanding of the reading process should seek training in linguistics, especially in transformational grammar. Possible contributions have already been suggested.

Teachers who have training in linguistics and in reading should be provided with an opportunity to work with reading supervisors in small seminar groups where appropriate changes and innovations in the classroom developmental reading programs could be worked out.

These opportunities are necessary for teachers so they can benefit from the assistance of reading supervisors in the application of their knowledge of linguistics and the latest research results in reading.

To help meet student needs in the development of understanding of connectives it would be beneficial to have the teacher assess the needs of the class and institute changes in the teaching of comprehension skills wherever they are needed.

The close tie between the cognitive processes, language, and reading make a knowledge of all three essential for teachers and supervisors. Training programs are needed to keep teachers informed in these areas.

Teaching Methods for Reading

In the study, only sentences from the basal readers were used in the Connectives Reading Test. However, if children develop in their ability to understand connectives using this material it is reasonable to assume that connectives in the reading materials of the content areas including literature, would show the same development of understanding. Reading instruction then, should be extended to these content fields. Godfrey[5] in a progress report of her survey of English usage indicated that writings from the fields of science

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[5]Judith A. Godfrey, "The Survey of English Usage," English Language Teaching, Vol. XIX, No. 3, April, 1965, pp. 98-103.

and literature were revealing the use of certain linguistic structures in characteristic ways. For example, in scientific textbooks 60 per cent of the nominal groups belonged to subordinate layers in the sentences while in novels, only 12 per cent did. Light literature has about half as many passive verbal groups as scientific literature. The results of this survey could be applied to textbooks in schools during the teaching of reading.

The meanings children have already attached to connectives they use in their speech, will develop mature meanings more quickly if teachers relate the oral language of children to the language written for them in their reading materials through carefully guided discussions. Special help should be given to connectives which communicate concession, link sentences together, and which conjoin ideas. Children appear to have trouble with the co-ordination of ideas when the connective occurs at the beginning of the sentence and it would seem appropriate that teachers provide assistance.

In order to give the students an opportunity to think out a series of solutions involving for example, concessions or conditions, teaching methods could include the giving of short verbal problems in reading.

The various needs of students in classes suggest strongly that differentiated instruction is necessary. The boys need assistance to develop more quickly their understanding of certain classes of connectives, and students of both sexes who have less understanding of

connectives than their peers, could be encouraged to use their own written language as a base from which they could gain more understanding of the connectives in materials others have written for them. The high achievers in reading perhaps should be encouraged to undertake more intensive work in comprehension earlier in their academic career and a planned program in formal language development could be included. Logic games would be excellent training for them as would assignments in which they were required to read forms of discourse other than narration.

To promote better understanding of the language structure students read, it would appear to be good teaching practice to encourage children during class discussions both in the language and the reading programs, to manipulate linguistic structures to investigate how the changes they make, affect the ideas they are communicating. Teachers should encourage children to explain what they read so they can check on the development of their understanding.

Teaching Materials for Reading

It is doubtful whether the complexity of the language of school books can be controlled more than it is because so little is as yet known about language complexity. Moreover, textbooks writers can rarely be persuaded to impose structure controls on their own writing, so children must learn to understand the formal language constructions laid out for them in print. Teachers' manuals and workbooks should,

therefore, provide more guidance for teachers, in such areas as this study encompasses; namely, the development of understanding of connectives in reading.

Children need to be introduced in the developmental reading program in grades four to six, to a wide variety of types of reading materials so connectives typical of different content fields can be introduced and taught to the children.

Additional types of exercises are needed in workbooks so children can work more directly and over a longer period of time with linguistic structures such as clauses which cause them some concern in reading. More exercises are needed which require them to manipulate linguistic structures so they can see how changing clauses into other language units and vice versa achieves different shades of meaning. Readings too, in exposition, argument and concession are three areas where short passages followed by questions requiring them to use the connectives which directed their thoughts, would provide excellent training.

VI. CONCLUDING STATEMENT

This study has shown that students develop in their understanding of connectives in reading. The children may acquire the language structures early in life but they only gain mature understanding of them gradually throughout their school years. Children use clauses

before they go to school but they do not develop an understanding of the meanings of the connectives in them such as adults have, for a number of years after that.

The connectives provide flexibility to the English language and because of the close tie between language and thought, the connectives also facilitate flexibility of thought. Children whose development of understanding of the connectives in print is aided further by systematic training through the reading program, should develop more facility in understanding verbal communications from the printed page. Differences between the language of print and the oral language, and the developmental nature of understanding of connectives in reading make a systematic and thorough program for the teaching of comprehension skills essential in the reading program.

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APPENDIXES

APPENDIX A

THE CONNECTIVES READING TEST

READING TEST

PART ONE

GENERAL DIRECTIONS

This is a test of some of the understandings you have been developing ever since you first entered school. You should take the test in the same way that you would work on any new and interesting assignment. Here are a few suggestions which will help you to earn your best score:

1. Make sure you understand the test directions before you begin working. You may ask questions about any part of the directions you do not understand.

2. You will make the best score by answering every question because your score is the number of correct answers you mark. Therefore, you should work carefully but not spend too much time on any one question. If a question seems to be too difficult, make the most careful guess you can, rather than waste time puzzling over it.

3. If you finish before time is called, go back and spend more time on those questions about which you were most doubtful.

DIRECTIONS FOR PART ONE

Each of the parts of this test is followed by four suggested answers. You are to decide which one of these answers you should choose. CHOOSE THE ANSWER WHICH YOU THINK IS THE BEST.

You must mark all of your answers on the separate answer sheet you have been given; this test booklet should not be marked in any way. You must mark your answer sheet by blackening the space having the same letter as the answer you have chosen. For example:

0 The dog ran around the house before ------------------------------

a. was built of wood
b. the men ever seen him
c. they lifted it out of the sea
d. the cat could scratch him

READING TEST

PART ONE

1. The clock showed that ---------------------------.

   a. time supper was
   b. the race had taken one minute and fifty-six seconds
   c. the players had dressed in red and white uniforms
   d. the girl never will ran for two hours and thirty minutes

2. When ------------------------------, Tony travelled twelve miles to study.

   a. the teacher will open the school for lessons
   b. the measles kept him in the house
   c. the teacher began lessons in the school
   d. his father opened his box for the mail

3. He works harder than any of us, yet ------------------------------.

   a. surprises all the students
   b. he explains, 'I enjoy my sleep all day and I never think of it as play!'
   c. he says, 'I never worked a day in my life and I never will!'
   d. he explains, 'I like to carve the geese out of wood every day and I always willing.'

4. "It's where -----------------------------," exclaimed the farmer loudly.

   a. the new cows from the barn goes
   b. the old bell near the barn stops ringing
   c. the fat cattle in the field will lay eggs
   d. the young horses in the pasture will stay

5. He won the fight but he knew he might have lost it if Jerry had been bigger. However, ------------------------------.

   a. all will be bad tomorrow
   b. all's well that ends well
   c. all's black that got the hit
   d. all's ending that are well

6. Now we have a new factory but ---------------------------- and the blast furnace is cold and silent.

   a. there will have been no chimney
   b. has many rooms
   c. there is no fuel
   d. there is no snow

7. The picture was brought from an old cave and ----------------------------.

   a. the boys who discovered it liked
   b. the only one who knows it is this friend of ours
   c. many people who read like this kind of story
   d. the only one who knows them is this friend of ours

8. This time Nancy ran across the bridge, and ------------------------------.

   a. fifteen girls cheered her
   b. had deliver the message
   c. the flood had damaged
   d. some girls combed their hair

9. The provinces that ------------------------------ set Mark thinking about the making of history.

   a. were being linked to their cousins
   b. towns were being linked by the railway
   c. could have been linking by the railway
   d. were being linked by the railway

10. "Did you finish your spelling?" said the teacher to the little boys who ------------------------------.

   a. because they put their pencils down on their desks
   b. sisters were teasing them about their spelling
   c. were writing some words on their papers
   d. were racing down the hill on the wagons

11. It did not move, however, for it weighed four tons, ------------------------------.

   a. it was too heavy to lift
   b. and was pushed around easily
   c. and were fastening down well
   d. and was fastened down tightly

12. "Throw it into the lake!" the kind commanded. So ------------------------------.

   a. they could had thrown the treasure in the water near the shore
   b. the slaves refused to obey the command
   c. the slaves dumped the treasure over the side into the water
   d. they buried the treasure in the cave at sunset

13. The lad was proud, for ------------------------------.

   a. is a good thing to be at times
   b. he carried his own spear every day on his shoulder
   c. he may lend his spear to his friends every day
   d. he fell on his face in the mud

14. I tell you ------------------------------ that doesn't fly.

   a. I can't wait to tell a story
   b. I couldn't afford to buy a pig
   c. I can't afford to buy a plane
   d. I wouldn't afford to buy a plane

15. Because ------------------------------, they could easily get lost in the grass and weeds.

   a. their mother didn't want to lose them
   b. the baby insects stayed in the trees
   c. the baby insects was so small
   d. the baby insects were so small

16. If ------------------------------, he can check it.

a. he hadn't known the dog was rescued
b. he shall have proved the brown bear was captured
c. he can't learn to shoot
d. he won't believe the brown bear was captured

17. We watched the old house, yet ------------------------------.

a. we could have missed the car ride
b. there was a mysterious guest
c. we will seen the man there
d. we have not seen him

18. When ------------------------------, his payment was barrels of food.

a. he will trading furs at the fort
b. my grandfather traded furs during the winter
c. he ate fish out of the river
d. my grandfather refused their food

19. Cows could not be kept and, if ------------------------------, her baby was buried with her.

a. the boat was lost
b. the baby have no milk
c. a mother died
d. they bought some milk

20. So ------------------------------ the riders I have been hearing about.

a. will see
b. you are
c. you mailed
d. he is

21. If ------------------------------, you'd have lost it in the lake.

a. you'll drop the paddle over the side of the boat
b. you'd mended the hole in the boat
c. you'd milked the cow in that barn
d. you'd gone swimming with the message in your pocket

22. He enjoyed living with the tramps. Yet in his heart ------------------------------.

a. he knew that this life was only for those who were born to it
b. she knew that the songs were for all who liked them
c. he knew that he disliked those who climbed mountains before breakfast
d. he liked very much

23. The young animals in their burrows were protected so ------------------------------.

a. the older ones all went out to roast corn around a fire
b. the night raiders they often tried to squeeze into the burrow
c. the sun sank in the west
d. they had little to dread from the night raiders

24. For days, the boys who ------------------------------ talked about the goal that won the prize.

a. had fed the bears
b. was a purse of money
c. had seen the game
d. friends had seen the game

25. "These seven women are not the only nurses ------------------------------!"
EXPLAINED MRS. BROWN.

a. uniforms were splattered with ink
b. the printer needs for the press
c. the hospital needs for the sick
d. the doctors have been asked for help

26. "She won't be able to catch the fish if ------------------------------," replied Grandfather.

a. she may fool us
b. she washes the sand out of her hair
c. it will jumps out of the boat
d. she loses the hook on her line

27. Although ------------------------------, he bought one from the man at the market.

a. he knew where he could borrow a lamp
b. only they knew where he had gone fishing
c. they said to him where the lamps were on sale
d. he found the lamp where she will hide it

28. "Show me the prize and ------------------------------," answered Roger happily.

a. let me start to pass around the candy
b. let me discover it
c. you received yesterday from your teacher
d. let me start to passing the candy around

29. His father did not know that they had heard a lost lamb, and they could not search for it because ------------------------------.

a. they could leave the flock
b. they were guarding the flock in the valley
c. when he left the flock in the valley
d. they were sleeping in their beds

30. He carried the dog to the house where ------------------------------.

a. Joan was waiting to nurse him
b. they were too sick to helping him
c. they were climbing the hill
d. the train had run over him

31. "The men are not the only soldiers ------------------------------!"
REPLIED CAPTAIN YOUNG.

a. they train for the sea
b. we had have sent into the army
c. guns are loaded
d. we train for the battle

32. To Bruce the spear looked beautiful, and ------------------------------.

a. he decided he had bought it
b. he promised himself he would ask for one
c. when he decided he would buy it
d. he reminded himself he could row his boat

33. Her father would not know that she had closed the door of the chicken house, and they could not see the door because ------------------------------.

a. the chicken house was almost hidden behind the barn
b. the hen house wasn't front of the barn
c. they walked toward it
d. the chicken house had just been painted red

34. Next month the men will visit the factories in other countries which ------------------------------.

a. workers have begun to make toys
b. has begun to make cars
c. make clouds for the sky
d. make toys for the children

35. Bill headed straight for the mine and wished that he could drive up to the site where ------------------------------.

a. are the captain and his men rescuing the miners
b. had trapped the miners
c. the captain and his men were rescuing the miners
d. the captain and his men were flying from the arctic

36. The two sailors were both tired. Yet ------------------------------.

a. the captain have had to give them a lot of work
b. the big dogs still wanted to eat more meat
c. they both wanted to go to bed early
d. each one still wanted to finish his work

37. If the speed of the plane is three hundred miles an hour, however, ------------------------------.

a. how high would it go in two hours
b. he had arrived in time
c. he could arrive by train
d. he might arrive in time

38. One of the girls wore a coat ------------------------------.

a. the night chilled them to the bone
b. she has sent to her cousin
c. she might make for herself
d. her mother had sewed for her

39. When the boot moves out of the range of an English station, it will come into the range of an American station immediately. Thus ------------------------------.

a. the radio operators may lose contact through bad weather
b. a vessel can lose a passenger over the side very easily
c. a vessel can remain in contact with land for its entire voyage
d. a boat has had in touch with people all the time

40. Jim pulled the emergency cord four times, but --------------------------------.

a. the train only slowed down for a minute
b. wasn't often enough for the engineer
c. the engineer has only laughs at him
d. the horse only ran faster

41. The horses can follow the criminal who takes to the hills where --------------------------------.

a. cars cannot follow him
b. have many hiding places
c. he can live in the clouds
d. the police could not of found him

42. I am sure ------------------------------.

a. he tells me is the truth
b. listen because your father would like you to read all the books you can
c. your father would like you to get all the education you can
d. your dog would beg you to bring all the cat food you can

43. Never once did the young man miss a game, yet ------------------------------ that he had to be helped to play.

a. quite often, he was so far away
b. did he tell his family
c. he will be so sick often
d. at times, he was so lame

44. The two clubs were both interesting. Yet ------------------------------.

a. the third club had lost its members
b. each driver still wanted to have his own license plates
c. each leaders wanted to teach different sports
d. each club wanted to learn a different craft

45. The reason the other girls had chosen her captain was that ------------------------------.

a. she had won so many of the games
b. she had dropped so many of the eggs
c. he works so hard on the team
d. they were arguing about

46. But by this time each boy knew quite a bit about the farm because ----------
---------------------.

a. he will study many books about animals
b. has some fine cattle in the fields
c. he had been a good swimmer for a long time
d. he had been a regular visitor to the barn

47. "You need not drive so wildly, John," Bill cautioned. But ----------
---------------------.

a. he will added, "Get us there"
b. the girls added, "Eat more"
c. he added, "It's dangerous"
d. Mary and Helen cried, "Go faster"

48. They were chased by the largest seals -----------------------------------.

a. the ice had broken
b. the men may of seen
c. the Indians had seen
d. the hunt had ended

49. Bob had always fought seals from his boat. He left it, however, ----------
---------------------.

a. he could kill the wounded seal on the ice
b. and picked flowers in the field near the city
c. and rushed along the ice toward the wounded seal
d. and rushing along the ice toward the wounded seal

50. But she cooked the potatoes and meat on his stove so --------------------
----------.

a. she could fly
b. she have eaten
c. is very hot
d. she could help him

R E A D I N G   T E S T

P A R T   T W O

DIRECTIONS FOR PART TWO

Part Two contains the same kind of material as Part One. Mark your answers in the same way.

READING TEST

51. 1. "I don't mind the pain if ------------------------------," said Joe.

a. the hail ruins the crops
b. hurts my arm so much
c. he are going to the hospital
d. I can go to the game

52. 2. Henry and Joan were tired too, for, if they did not hold the cart, ----------------------------------.

a. their father did
b. the cart tipped
c. they tipped
d. their father slept

53. 3. When --------------------------------, she realized that the animal had been hurt.

a. she hadn't seen the accident
b. the boys have brought their friend's monkey
c. she dug up her mother's potatoes
d. the man put down his son's monkey

54 4. But travelling can be an unhappy adventure, if ------------------------------.

a. makes everyone sad
b. the road are good
c. everyone keeps smiling
d. someone keeps complaining

55 5. The batter had never been struck out in a ball game. On the last powerful pitch, however, ---------------------------------.

a. he made a home run
b. they will miss the ball again
c. he missed the ball
d. he swam over the line

56 6. His quiet thirty-five-year-old companion, who walked with a limp because --------------------------------, was Arthur Brown, an expert in flying.

a. she had been hurt in the world war
b. his left leg had been injured in a plane crash
c. he had been asked about the air force
d. he had learned to fly

57 7. If --------------------------------, the man would have been afraid.

a. the seal had left the fish on the ice from which the man was fishing
b. the seal's nose had bumped against the boat in which the man was sitting
c. the seal was sleeping on a cake of ice far away from the boat in which the man was sitting
d. the seal's body had hitting against a boat in which a man was rowing

58. This great doctor was regarded as a miracle worker by all who ---------------------------------.

a. watched him cut the grass
b. he healed them in the hospital
c. heard him lecture about his work
d. children had been sick during the year

59. Then she asked, "Is there anything -----------------------------------?"

a. I go for supper
b. I can do for your
c. I can think for you
d. I can do for you

60. During the day the ladies who --------------------------------- won a prize that pleased them.

a. sells the cakes
b. they met the judge
c. baked the pies
d. were watching the stars

61. The treasure is well hidden where ------------------------------.

a. no one else can find it
b. everyone can hear it
c. the sailors are not able to find our map
d. no one will look for them

62. "It's where -------------------------------," called Jim cheerfully.

a. the new students at the school begins
b. the busy workers at the fair get off
c. my new pennies from the bank paid for
d. the tiny fish serve cakes

63. They didn't paint much today because ------------------------------.

a. when they spill the paint
b. we haven't seen all of it
c. they can hire a painter
d. they like the rainbow

64. "You need not hold the reins so tightly, Jane," he cried. But --------------------------------.

a. he added, "Later on."
b. Betty and Anne added, "Read faster."
c. he added, "Help we later."
d. Betty and Anne shouted, "Hold on tighter."

65.15. The knights used the sword that ------------------------------.

a. blade cut the old dragon in the head during the fight
b. sliced the potatoes for the food in the kitchen
c. can wounds the old dragon in the head during the fight
d. slayed the old dragon in the cave near the sea

66.16. "Just imagine, Sir Tony," said Billy, stroking his pony's neck, "on our way to the coast we'll see the prairies where ------------------------------."

a. stretch for many miles
b. cattles were living by the hundreds
c. the knives cut through the cloth
d. cows roam by the thousands

67.17. The reason the boy had kept himself strong was that ------------------------------------.

a. he wanted to show us
b. he wanted to carry his boxes alone
c. he had seen so many stores recently
d. it had lifted many of the weights before

68.18. George gazed along the mountain top and hoped that he could crawl up to the place where ------------------------------.

a. sheltered Jim and the lamb
b. Jim and the lamb were awaiting rescue
c. Jack and his friends were riding in the airplane
d. Jim and the lamb had awaiting rescue

69.19. The funny acts of the elephants are not forgotten. Thus -----------------------------.

a. those who climbs the pole are still giving thrills to many people
b. the bears who just sit in their cages are not forgotten either
c. those who travel in canoes still keep their paddles in good condition
d. the one who sprayed the water is still giving laughs to many children.

70.20. "I will keep my mind on my lessons during school," thought Anne, for ------------------------------.

a. they wanted to learn about plants for their garden
b. she was baking cookies for the boys
c. she tried to think of a way of missing some classes
d. she wanted to get skates for making good marks

71.21. Although ------------------------------, his main concern was making money.

a. Dr. Smith will begin his work in the morning
b. Dr. Smith played with his toys in the garden
c. Ernest did in the stores during the week
d. Ernest had great love for sports

72.~~22~~. "Seals don't usually eat fish the fishermen need. And ----------------
---------------," replied Tom.

a. fishing has been good around here lately
b. when fishing has been poor
c. swimming has been good around here lately
d. they has found many fish every day

73.~~23~~. Although ------------------------------, he finally captured the princess.

a. he had look for her in the forest
b. after he fought the battle
c. the dragon had to fight many battles during the week
d. the dragon had no food for breakfast

74.~~24~~. Anyway you can't ride my horse either because ------------------------------.

a. you learn to drive my car
b. he has hurted his foot
c. you like to paint too
d. you were talking about me

75.~~25~~. The tiny boat was much too small for them, but, if it had been a launch,
------------------------------.

a. they would not had been able to buy it
b. they could not have enjoyed it more
c. he could not have planted his garden
d. did not have any sails

76.~~26~~. Jane usually remembered the bridge across the creek. She forgot about it, however, ------------------------------.

a. and waded across the flooding creek to the other side
b. would she get across the creek to the other side
c. and sat down on it to fish
d. and tried to jumps across the creek to the opposite bank

77.~~27~~. A few of the bears ate fish ------------------------------.

a. the animals had caught with spears
b. none of them ate leaves from the trees
c. the child have thrown to her
d. the boys had bought for them

78.~~28~~. All the time the man looked for the donkey, and ------------------------
------.

a. he searched every hat box
b. the man had stolen
c. his thoughts was sad
d. his heart was heavy

79. ~~29~~. Then Paul asked, "Who built the factory that -------------------------------?"

a. I saw in the mud on the road
b. I seen from my window today
c. I work every day with my friends
d. I passed on my way to school

80. ~~30~~. Although Dorothy liked saying her poems, she wondered if she could entertain a large audience all by herself. But --------------------------------.

a. she never thinks of the time when she prepare
b. she never thought of not going when she was invited
c. she never thought of locking the door when she left the house
d. because they never thought of speaking when she was speaking

81. ~~31~~. You will find that there is an editorial about words that ------------------------------.

a. taking on new meaning in the space age
b. are stored in boxes in the arctic
c. none of them is new to us
d. have taken on new meaning in the space age

82. ~~32~~. I could see that Jerry wasn't going to open the window. But ------------------------------.

a. we had known that he is trying it
b. I knew that I would knit my gloves
c. I knew that I could do it
d. when he took the ladder that I had borrowed

83. ~~33~~. "There," said the man, "is a winged horse for princes that ------------------------------."

a. have to fight with monsters
b. want to shine their shoes
c. have to fight with many monster
d. mail must be delivered quickly

84. ~~34~~. But the stories always tell a little about the circus because ------------------------------.

a. it is an interesting show for everyone
b. has some interesting acts for the children
c. they are all about picnics
d. it are an exciting event for the children

85. ~~35~~. "Making a musical record would not be accepted by the radio station," said Mr. Jones thoughtfully. "But ------------------------------."

a. you would have a record of your voice
b. when you think of an idea
c. you have shown your skill in sewing
d. I must thinks of something else for you

86.36. But the medicine which ------------------------------ cost Dr. Jones much money.

a. it helped the pain
b. he had to build of wood
c. was hard getting for his patients
d. he had to give his patients

87.37. When they squeeze through the bars of the gate, they will come into the presence of the king. Thus ------------------------------.

a. the boys may stand before the king of the giants in his castle
b. the girls has seen the king of the giants in his castle
c. the children can roast their corn around the fire on the picnic
d. we cannot be sure they will see the king

88.38. Although ------------------------------, Walter could see that his eyes were closed.

a. he had looked at the boy's feet for a second
b. the boy's cap have been taken away from his eyes
c. when he had taken off the boy's cap
d. the boy's eyes were shaded by a fur cap

89.39. "I've painted nothing yet," Mary said to her teacher, "so ------------------------------."

a. I don't see very well
b. I can't delay any longer
c. He didn't scolds her
d. makes me very sad

90.40. The palace guard arrived when ------------------------------.

a. the children had went away on a picnic
b. the princess was playing in the garden with her ball
c. they couldn't come to the place
d. did the princess play in the garden with her ball

91.41. If ------------------------------, he will tear it to pieces.

a. the bear leaves the coat
b. the bear reaches the coat with his paws
c. the bear scratches at the tent with his claws
d. the bear doesn't see the coat

92.42. You will remember that there is a rule for horse races for everybody that ------------------------------.

a. when they begin the race
b. has a dish of pudding for supper
c. did entered young colts
d. enters young colts

93.~~43~~. "I've built nothing yet," Ben replied in a disgusted tone, "so ------------------------------."

a. the weather is too bad
b. I won't try anymore
c. I don't peel potatoes well
d. they won't get helping

94.~~44~~. When ------------------------------, she said that the song should be changed.

a. the child heard the man song
b. she was singing the man's song
c. the teacher heard the man's song
d. she hadn't heard it

95.~~45~~. 'Why do you always have to do exercises in the morning?" Peter questioned quietly. "Because ------------------------------," Aunt Rose replied, amused at Peter's words.

a. your uncle is worries about my weight
b. your uncle teases me about my weight
c. else could I do to lose weight
d. your uncle needs to lose weight

96.~~46~~. Aunt Mary had rented the brick house three times, but ------------------------------.

a. because she needed the money next week
b. every family had moved out within a week
c. everybody likes to walk
d. she has moved in herselves

97.~~47~~. The shadows had deepened when ------------------------------.

a. Philip found the trail up the cliff
b. the rain was falling on the forest
c. Philip may lose the trail up the cliff
d. the trails meet halfway up the cliff

98.~~48~~. "Do you want the kitten?" said the man to the small girls who ------------------------------.

a. were rowing on the lake alone
b. they picked it up from the box
c. were looking at it in the box
d. had watching the animals in the store

99.~~49~~. If ------------------------------, she could rent it.

a. she proved the man's question was answered
b. she didn't the brick house was haunted
c. when she asked the old house be torn down
d. she didn't believe the brick house was haunted

100.~~50~~. "There's your father's rifle," Jack's mother would say when ------------------------------," and before long Jack would be home with a rabbit.

a. meat was scarce
b. the gun was missing
c. she wanted eggs
d. they wants meat

READING TEST

PART THREE

GENERAL DIRECTIONS

This is a test of some of the understandings you have been developing ever since you first entered school. You should take the test in the same way that you would work on any new and interesting assignment. Here are a few suggestions which will help you to earn your best score:

1. Make sure you understand the test directions before you begin working. You may ask questions about any part of the directions you do not understand.

2. You will make your best score by answering every question because your score is the number of correct answers you mark. Therefore, you should work carefully but not spend too much time on any one question. If a question seems to be too difficult, make the most careful guess you can, rather than waste time puzzling over it.

3. If you finish before time is called, go back and spend more time on those questions about which you were most doubtful.

DIRECTIONS FOR PART THREE

Each of the parts of this test is followed by four suggested answers. You are to decide which one of these answers you should choose.

You must mark all of your answers on the separate answer sheet you have been given; this test booklet should not be marked in any way. You must mark your answer sheet by blackening the space having the same letter as the answer you have chosen. For example:

0 The man will not climb into the boat until -----------------------------.

a. they decides to go rowing
b. he wants to go fishing
c. it begins to sink
d. he doesn't like to fish

READING TEST

101.1. Now he suspected that in giving to him the new plow which ------------------------------, the men had tricked him.

a. will need some gasoline to running it
b. was the poor farmer to do
c. mixed cement for the sidewalks
d. required another machine to pull it

102.2. When they play their trumpets in front of the tomb of their leader, they will remove the curse from the people of the land. Thus ------------------------------.

a. who have lived in sadness for many years
b. the football team could bring back the prize for the school
c. the musicians can rejoice with the people of the country
d. the musicians gives joy to the people of the land

103.3. Collecting natural objects is good, for ------------------------------ and the specimens cost you nothing.

a. when the weather is nice
b. it takes one out of doors
c. it gives one too much food
d. it can gives one much fun

104. 4. The hunters tramped the woods all day in vain. For ------------------------------.

a. not one pound had been added to the baby's weight
b. darkness fell over the woods that night
c. some rabbits were caught by the hunters the next day
d. not one rabbit had been seen in the area

105.5. Although ------------------------------, he saw that there were three small rivers in the valley.

a. he had not gotting to climb the mountain
b. when he looked at the pictures
c. Peter could not find the lakes
d. Peter had fed three bears

106.6. "Listen to his story," the father said. So ------------------------------.

a. the man dug up the carrots in the garden
b. the man did not hear him above the noise
c. the miner told the family about the fire in the mine
d. he had told them all about his adventures on the sea

107.7. At last he said with a sigh, "I cannot refuse to answer your question although ------------------------------."

a. I would prefer not to have more questions from those who have already spoken
b. you have cooked a meal for those who have not already eaten
c. you has come to bring some help to those who have already asked
d. can be very helpful for those who are listening

108. They went back to the cage where ------------------------------.

a. the monkeys will have trying to catch the peanuts
b. was open to receive the tiger
c. the tiger was waiting to devour his dinner
d. the snow was beginning to cover the mountains

109. The machine dragged the heavy plow that ------------------------------.

a. could breaks up the big pieces of earth for the seeds
b. breaks up the big pieces of earth for the seeds
c. threaded the needle for the lady
d. steel teeth dig up the earth for the farmers

110. "Why are you poor at golf?" he asked angrily. Because -------------------- ---------------," Dan retorted, hurt by Will's words.

a. you teases me during the game
b. is my favorite game
c. I hit my ball too hard
d. I am baking apple pie for supper

111. "Carrying baby insects on her back would not be easy for their mother," explained the teacher carefully. "But ------------------------------."

a. she could moved as easily as before
b. she wrote on the blackboard as neatly as before
c. when she hunted for food daily
d. she could move as quickly as required

112. He found the place in the cave where ------------------------------.

a. is the money now
b. the forest was growing
c. the money was hidden
d. the lions was sleeping

113. The brave deed of the fighter is not forgotten. Thus -------------------- ----------.

a. the knight who fought with his friends are helping to bring peace to the country
b. many people who picked strawberries will be eating them for supper
c. the soldier who died for his country is still helping to bring peace to a troubled world
d. the fighters who died for their countries are forgotten

114. "Oh, I'll bet he bought a football. And -------------------------------," said Bob.

a. I'll bet he'd buy a new baseball if he could
b. I'll bet he is got a new baseball if he can find it
c. I!ll bet he bought a big button for his coat
d. many people believed he'd do if he wanted to

115. Bobby and the man went to the mail box first, for ------------------------------ which Bobby's mother had just written.

a. they had brought a letter with them
b. they were carrying a kitten in their arms
c. they were writing a shopping list on the letter
d. they were carried a parcel with them

116. "I will carry the rug to the market in the city," said Bob, for ------------------------------.

a. he had to ask for help in lifting it
b. he wanted to have some meat for dinner
c. he wanted to have a part in selling it
d. he wanted to be some help in takings it

117. Your teacher saw you were on board when ------------------------------.

a. the steamer started down the river
b. the boat is leaving the pier
c. he talked to you on land
d. did the steamer start down the river

118. He delayed the other men, yet ------------------------------.

a. feet were not sore
b. they could not leave him
c. they could not eat his cake
d. he had not frozed his feet

119. "You'll know this fish by the fins which ------------------------------," Jim explained to the children.

a. tails stick up out of the water
b. stick up out of the water
c. horses never have at all
d. cutting through the water

120. The pig had never been penned up before. In one last desperate dive, however, ------------------------------.

a. Peter was able to swim
b. he was able to caught him
c. Peter was able to box him up
d. because he wanted to go home

121.21. Although ------------------------------, they knew that there were two kinds of cake on the table under the tree.

a. they liked cakes
b. the boys has seen the food
c. the boys did not see the food
d. the lady threaded the needle

122.22. Then he asked, "Who took the old lamp that ------------------------------?"

a. I lit in the bucket of water
b. I left in the hall of the golden windows
c. they could had bought from the man at the lake
d. light shone in the room across the hall

123. 23. We can cook everything that ------------------------------ and enjoy it.

a. the canoe arrives
b. we has planned
c. the car hits
d. you can cook

124.24. The cowboys told the story that ------------------------------.

a. they was shown a wild horse that they couldn't catch
b. picture showed the horse that they couldn't ride
c. they had been given a wild horse that they couldn't ride
d. they had roped a big house that they couldn't use

125.25. He did not leave his post and he was shot by an arrow which ------------------------------.

a. was made of glass
b. had shot from below
c. sped from a hostile bow
d. tip stuck in his back

126.26. It was my favorite aunt who ------------------------------.

a. send me a football on my birthday
b. gave me the present on my birthday
c. never was nice to me
d. present surprised me on my birthday

127.27. Never once did the airplanes hit the trees, yet ------------------------------ that the pilot had to be ordered to fly above the clouds.

a. now and then the whistle blew so loud
b. were always so green
c. quite often, the citizens was so afraid
d. at times, they were so close

128.28. But they cleaned the grass and dirt from his mask so --------------------------------.

a. he could do it
b. she could see
c. he had to think
d. he could see

129.29. Next day Jane will bring the drum of wood on which ------------------------------.

a. she eats for lunch
b. sounds made wonderful music
c. he is listened to her song
d. she beats with her hands

130.30. But the horse on which ------------------------------ gave the boys much trouble.

a. back they wanted to fasten their saddle
b. they curled their hair
c. they wanted to fasten their saddle
d. they are wanted to ride

131.31. Jean was sure that her father, although ------------------------------, knew about her dog's good behavior.

a. he had not be watching her pet
b. he opened the tin of soup
c. he said so
d. he said nothing

132.32. "That," said dad, "is a wonderful machine for animals that ------------------------------."

a. have to kills the flies
b. tails are cut too short
c. like to keep away from flies
d. want to make fresh tea

133.33. He was thinking that anyone who ------------------------------ couldn't be a poor artist.

a. could paint that scene
b. have drawn that picture
c. could cut that grass
d. hands could paint that scene

134.34. He did not speak, however, for he tried five times, ------------------------------.

a. and could of spoken clearly
b. and could have used his shovel
c. and he could not open his mouth
d. is too often

135.35. It was the wounded pilot who -------------------------------.

a. sowed his field with wheat
b. flew us through the storm
c. brought we from the airport
d. plane rescued us from the island

136.36. "Well, you left the lunch dishes on the table," said Jack, "so ----- ------------------------ I would wash them."

a. what
b. you has thought
c. I laughed
d. I thought

137.37. "Start that car and ------------------------------," said the man proudly.

a. you just bought from the store
b. watch me fly through the trees
c. got to work on this business
d. watch me fly up this hill

138.38. The last days of Captain Scott are not forgotten. Thus --------------- ---------------.

a. the last days of other men who has died in the arctic are never forgotten either
b. Captain Scott froze to death is a distressing story
c. the last child who is standing in the line will get a candy
d. this man who died in the arctic is still helping to give courage to many children

139.39. Many workers in the camp wanted to bet on the horse, although ---------- ---------------------.

a. they been considering the horse an animal of speed
b. was a marvellous racing pony
c. some men considered it a waste of money
d. the dogs ran around the house a lot of times

140.40. The teacher taught them that -----------------------------.

a. the first radio could appear about one thousand years ago
b. the first wheel appeared about two thousand and fifty years ago
c. all the students should sleep during his lessons
d. was in the volcano

141.41. Mary and her mother went to the rug market first, for -------------- -------------- which Mary's father had just given them to sell.

a. they had brought a rug with them
b. they really wanted to wash the car
c. they were making pies for the store
d. they was carrying rugs with them

142. ~~42~~. He returned to the well where ------------------------------.

a. was beginning to give water
b. he had hope to drink the water
c. the men were shooting seals
d. the horse was coming to drink water

143. ~~43~~. Jimmy looked at the house and he knew that ------------------------------.

a. he had to buy a shovel
b. it had burned to the ground tomorrow
c. it belonged to his Aunt Mary now
d. the trouble was

144. ~~44~~. "He'll answer the questions from the letters which -------------------- ----------," Miss Smith told the pupils.

a. was written in many countries
b. writers live all over the world
c. were hidden in boxes
d. came from all over the world

145. ~~45~~. "I don't need the two presents my father bought. And --------------- ---------------," cried Ruth.

a. giving them away are good for me this Christmas
b. giving them away will be fun for me this Christmas
c. chasing the cats away is hard for an old lady
d. when giving has been fun for me this Christmas

146. ~~46~~. "Won't you have something that ------------------------------ if you win?" he asked at last.

a. value is great
b. you could shown
c. breaks your heart
d. proves your victory

147. ~~47~~. The fish was hungry, for ------------------------------.

a. it took the bait with the first snap
b. it did ate the worms without a second look
c. it would not eat the bait
d. it swam through the water very slowly

148. ~~48~~. Everyone in our school had to enter the contest, although --------------- ---------------.

a. he consider the prize a lot of money
b. the meat burned the pan black
c. offered many wonderful prizes
d. I considered it a waste of time

149.49. They were driven in the biggest car ----------------------------.

a. the men could find
b. the water had washed
c. was a beautiful blue
d. the truck have smashed

150.50. It may be that your grandfather did not see the picture when ---------
---------------------.

a. he looked through the magazine
b. did he look through the magazine
c. he slept through the night
d. was finished on Saturday

APPENDIX B

THE WRITTEN CONNECTIVES TEST

R E A D I N G   T E S T

P A R T   F O U R

Fill in the blank with the word which you think best completes the sentence. Only put ONE word in each blank space.

Example:

"He'll plant the field with a machine --------------------- drops the seeds into the ground," Jack explained to the boys.

1. "She can't hear the organ -------------------- she puts her fingers in her ears," said Bill.

2. They must realize -------------------- there is a lot of gold here -------------------- will be a great fortune for me.

3. The world did not know -------------------- a ship could make a long haul, -------------------- they did not believe it -------------------- the steamers devoured such mountains of coal

4. Never once did he complain about the pain, --------------------, at times it was so intense, -------------------- he had to be helped to dress in the mornings.

5. The house was covered with water when the river flooded. ----------------- the furniture was flooded.

6. -------------------- the soldiers saw the king's grief, they knew -------------------- his daughter must be found.

7. -------------------- the school at -------------------- they learned to play football defeated them many times.

8. Carl paddled straight against the current and hoped -------------------- he could crawl up to the place -------------------- Jim and the lamb were awaiting rescue.

9. Sam laughed -------------------- Jane tumbled into a mound of wet snow.

10. Anyway we need not carry her at all, -------------------- they are taking her by car.

11. They hurried back to the farm -------------------- Tom was learning to rope horses.

12. The deer was friendly, -------------------- he took the bread out of our hands.

13. -------------------- indignation flooded his heart for a minute, Arthur showed no anger.

14. 'Will you catch the rabbit?" called the old men to the boys -------------------- were watching it in the garden.

15. "I've eaten my breakfast," Alice replied in an offended tone," -------------------- I'm not very hungry."

16. "You need not run so fast Bob," she advised. ------------------ Joe and Howard added, "Run faster."

17. The two children were both ashamed. -------------------- each child still wanted to have his own way.

18. This time Bill concentrated his attention on the honey, -------------------------- the bees became angry.

19. One cannot always be a hero, -------------------- one can always be a man.

20. The streams are dry -------------------- there has been little rain.

APPENDIX C

SUMMARY OF STUDENTS' ANSWERS ON

CONNECTIVES READING TEST BY GRADE

TABLE LII

SUMMARY OF STUDENTS' ANSWERS ON CONNECTIVES READING TEST BY CONNECTIVES

Connec-tive	Grade	Percentage of Students Who Chose: ANSWERS ON CONNECTIVES											
		CORRECT			GRAMMATICAL ERROR			SITUATIONAL ERROR			WRONG CONNECTIVE		
		Single	Multi	Total	Single	Multi	Total	Single	Multi	Total	Single	Multi	Total
although	4	46.35	50.64	48.93	28.85	20.99	24.12	7.31	6.62	6.89	17.50	21.76	20.06
	5	59.09	59.80	59.52	19.32	17.85	18.43	6.44	5.37	5.79	15.15	16.98	16.25
	6	67.60	72.09	70.29	15.36	13.14	14.03	1.31	2.75	2.18	15.73	12.02	13.50
because	4	52.05	69.23	60.60	26.94	11.54	19.28	7.61	7.85	7.73	13.39	11.38	12.39
	5	62.35	73.30	67.82	17.77	11.16	14.47	6.93	7.54	7.23	12.95	7.99	10.47
	6	71.90	81.17	76.53	14.35	6.88	10.61	4.19	5.38	4.78	9.57	6.58	8.07
if	4	63.17	63.77	63.51	23.09	16.13	19.22	6.68	10.35	8.72	7.06	9.74	8.55
	5	73.73	71.60	72.55	18.01	12.84	15.15	4.32	9.52	7.20	3.94	6.04	5.10
	6	79.81	77.41	78.48	15.51	10.54	12.76	2.43	7.08	5.00	2.24	4.97	3.75
so	4	66.56	72.99	69.38	18.02	11.15	15.01	7.18	3.72	5.66	8.24	12.13	9.95
	5	76.61	79.69	77.96	15.89	8.81	12.78	3.15	4.02	3.53	4.35	7.47	5.72
	6	83.08	88.11	85.32	12.08	5.66	9.23	2.57	3.58	3.02	2.27	2.64	2.43
that (simple includer)	4	64.98	59.79	61.88	18.29	22.72	20.94	5.84	6.27	6.09	10.89	11.23	11.09
	5	76.23	68.88	71.84	11.70	16.84	14.76	5.28	5.36	5.33	6.79	8.93	8.07
	6	86.57	74.69	79.46	5.97	12.53	9.90	2.99	4.01	3.60	4.48	8.77	7.05

TABLE LII (continued)

Connective	Grade	Percentage of Students Who Chose: ANSWERS ON CONNECTIVES											
		CORRECT			GRAMMATICAL ERROR			SITUATIONAL ERROR			WRONG CONNECTIVE		
		Single	Multi	Total	Single	Multi	Total	Single	Multi	Total	Single	Multi	Total
when	4	61.63	60.55	61.16	14.79	16.96	15.74	12.02	13.02	12.46	11.56	9.47	10.64
	5	65.11	68.38	66.55	14.05	10.29	12.38	9.82	10.67	10.19	11.03	10.67	10.87
	6	75.19	78.68	76.73	8.67	6.80	7.84	7.92	8.30	8.09	8.22	6.23	7.34
where	4	66.29	66.24	66.27	20.13	16.37	19.11	5.51	6.65	5.82	8.07	10.74	8.80
	5	71.56	72.80	71.90	16.84	11.08	15.28	4.68	7.30	5.39	6.92	8.82	7.44
	6	80.90	82.75	81.40	12.64	8.75	11.58	3.75	3.25	3.61	2.72	5.25	3.41
that (relative pronoun)	4	58.92	56.12	58.00	17.27	15.15	16.57	7.59	11.07	8.73	16.22	17.67	16.70
	5	67.95	67.42	67.77	13.53	12.99	13.35	5.08	7.91	6.02	13.44	11.68	12.85
	6	76.40	78.20	77.00	10.21	9.21	9.88	3.09	5.83	4.00	10.30	6.77	9.13
which	4	56.03	48.39	52.16	19.84	25.43	22.67	6.81	8.73	7.78	17.32	17.46	17.39
	5	65.23	57.89	61.56	14.66	20.68	17.67	7.33	6.20	6.77	12.78	15.23	14.00
	6	79.59	70.36	74.98	8.24	18.39	13.31	3.37	2.63	3.00	8.80	8.63	8.72
who	4	52.01	67.68	57.97	29.72	15.91	24.47	5.42	6.82	5.95	12.85	9.60	11.61
	5	61.45	78.61	67.92	21.99	7.71	16.60	5.12	4.48	4.88	11.45	9.20	10.60
	6	73.08	77.31	74.67	18.20	15.21	17.07	2.71	2.74	2.72	6.02	4.74	5.53
"absent"	4	59.39	63.98	60.50	20.37	17.24	19.61	9.33	4.60	8.18	10.92	14.18	11.71
	5	70.13	74.81	71.16	16.67	13.36	15.94	5.41	2.67	4.81	7.79	9.16	8.09
	6	76.07	81.72	77.33	14.59	9.33	13.42	3.76	1.87	3.33	5.58	7.09	5.92

TABLE LII (continued)

Connective	Grade	Percentage of Students Who Chose: ANSWERS ON CONNECTIVES											
		CORRECT			GRAMMATICAL ERROR			SITUATIONAL ERROR			WRONG CONNECTIVE		
		Single	Multi	Total	Single	Multi	Total	Single	Multi	Total	Single	Multi	Total
and	4	55.92	53.67	55.17	22.04	16.71	20.25	6.62	9.62	7.63	15.41	20.00	16.95
	5	61.38	61.35	61.37	20.13	11.97	17.39	7.30	8.98	7.86	11.19	17.71	13.38
	6	71.45	68.00	70.29	16.08	11.50	14.56	4.36	6.25	4.99	8.10	14.25	10.15
but	4	67.36	55.45	62.55	13.47	25.24	18.22	5.83	8.99	7.10	13.34	10.33	12.12
	5	67.68	62.10	65.43	11.70	22.89	16.22	7.63	6.57	7.20	12.98	8.44	11.14
	6	76.97	70.49	74.38	7.63	18.61	12.02	5.63	5.64	5.63	9.76	5.26	7.96
for	4	67.27	58.85	63.56	16.21	16.73	16.44	6.36	8.27	7.20	10.15	16.15	12.80
	5	74.44	65.09	70.29	11.28	14.34	12.64	5.41	6.79	6.03	8.87	13.77	11.05
	6	80.96	76.07	78.79	9.45	11.96	10.57	3.15	2.80	3.00	6.45	9.16	7.65
yet	4	57.01	54.86	55.93	16.60	13.90	15.30	8.06	15.81	11.95	18.23	15.43	16.83
	5	64.85	63.53	64.19	12.41	11.09	11.75	5.26	13.35	9.30	17.48	12.03	14.76
	6	71.96	74.62	73.29	9.91	8.08	8.99	4.86	8.65	6.75	13.27	8.65	10.97
however	4	49.81	54.49	52.15	13.22	15.11	14.16	10.15	7.27	8.71	26.82	23.14	24.98
	5	61.03	61.47	61.25	9.13	13.16	11.15	7.98	5.83	6.90	21.86	19.55	20.70
	6	72.93	70.97	71.95	9.77	8.24	9.01	4.51	5.99	5.25	12.78	14.79	13.79
thus	4	32.56	34.19	33.38	19.49	32.39	25.93	9.23	6.68	7.96	38.72	26.74	32.73
	5	42.21	48.35	45.27	18.34	25.82	22.07	7.29	4.81	6.05	32.16	21.01	26.61
	6	54.52	59.00	56.77	16.08	18.75	17.42	4.52	4.50	4.51	24.87	17.75	21.30

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX D

NEWMAN-KEULS COMPARISON BETWEEN ORDERED MEANS

NEWMAN-KEULS COMPARISON BETWEEN ORDERED MEANS

Because the numbers of children in each achievement group were unequal, the means were ordered rather than the total scores of the groups. The critical values (both the 0.01 and the 0.05 levels) for the tests on the differences between pairs of means were computed by multiplying the appropriate figures from Table B4* with the multipliers given in the tables of this appendix.

The multipliers were:

1. For the total student group:

$$\sqrt{\frac{MSerror}{\tilde{n}}} \quad \text{where } \tilde{n} = \text{the harmonic mean}$$

$$\tilde{n} = \frac{5}{\frac{1}{80} + \frac{1}{80} + \frac{1}{81} + \frac{1}{72} + \frac{1}{89}} = 80$$

2. For the grade groups:

$$\sqrt{\frac{MSerror}{\tilde{n}}} \quad \text{where } \tilde{n} = \text{the harmonic mean}$$

e.g. In grade four, $\tilde{n} = \frac{5}{\frac{1}{27} + \frac{1}{27} + \frac{1}{28} + \frac{1}{28} + \frac{1}{24}} = 26.74$

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*B. J. Winer, Statistical Principles in Experimental Design (Toronto: McGraw-Hill Book Company, Inc., 1962), p. 649.

TABLE LIII

NEWMAN-KEULS COMPARISON BETWEEN ORDERED MEANS - GRADES FOUR TO SIX

Scores Grouping acc. Connective	Table of Newman-Keuls Comparison Between Ordered Means: Multiplier		Means	5	4	3	2	1
"although" items	0.14774		Means	8.753	7.639	6.123	4.337	2.563
		1	2.563	6.190***	5.076**	3.561**	1.775***	0.000
		2	4.337	4.415**	3.301**	1.786**	0.000	
		3	6.123	2.629**	1.515**	0.000		
		4	7.639	1.114**	0.000			
		5	8.753	0.000				
"because" items	0.16299		Means	8.865	7.994	7.136	6.000	3.637
		1	3.637	5.228**	4.307**	3.498**	2.363**	0.000
		2	6.000	2.865**	1.944**	1.136**	0.000	
		3	7.136	1.729**	0.809**	0.000		
		4.	7.944	0.921**	0.000			
		5.	8.865	0.000				
"if" items	0.1441		Means	8.292	7.361	6.605	5.862	3.512
		1	3.512	4.780**	3.849**	3.092**	2.350**	0.000
		2.	5.862	2.430**	1.499**	0.742**	0.000	
		3	6.605	1.687**	0.756**	0.000		
		4	7.361	0.931**	0.000			
		5	8.292	0.000				

*** - significant at the 0.01 level of significance.

** * - significant at the 0.05 level of significance.

TABLE LIII (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"so"	0.14321		Means	8.607	8.125	7.444	6.375	3.550
		1	3.550	5.057**	4.575**	3.894**	2.825**	0.000
		2	6.375	2.232**	1.750**	1.069**	0.000	
		3	7.444	1.162**	0.681**	0.000		
		4	8.125	0.482ns	0.000			
		5	8.607	0.000				
"that" - (simple includer)	0.10017		Means	4.573	4.278	3.617	3.025	1.825
		1	1.825	2.748**	2.453**	1.792**	1.200**	0.000
		2	3.025	1.548**	1:253**	0.592**	0.000	
		3	3.617	0.956**	0.660**	0.000		
		4	4.278	0.295ns	0.000			
		5	4.573	0.000				
"when"	0.15132		Means	8.146	7.389	6.333	5.150	2.900
		1	2.900	5.246**	4.489**	3.433**	2.250**	0.000
		2	5.150	2.996**	2.239**	1.183**	0.000	
		3	6.333	1.813**	1.056**	0.000		
		4	7.389	0.757**	0.000			
		5	8.146	0.000				

ns - not significant at the 0.05 level of significance.

TABLE LIII (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
	Table of Newman-Keuls Comparison Between Ordered Means							
"where"	0.14617		Means	10.112	9.361	8.741	7.262	4.287
		1	4.287	5.825**	5.074**	4.453**	2.975**	0.000
		2	7.262	2.850**	2.099**	1.478**	0.000	
		3	8.741	1.372**	0.620*	0.000		
		4	9.361	0.751**	0.000			
		5	10.112	0.000				
"that" - (relative pronoun)	0.16972		Means	11.112	10.097	8.321	6.313	4.100
		1	4.100	7.012**	5.997**	4.221**	2.213**	0.000
		2	6.313	4.800**	3.785**	2.008**	0.000	
		3	8.321	2.791**	1.776**	0.000		
		4	10.097	1.015**	0.000			
		5	11.112	0.000				
"which"	0.13271		Means	6.888	6.181	5.704	3.612	2.350
		1	2.350	4.538**	3.831**	3.354**	1.262**	0.000
		2	3.612	3.275**	2.568**	2.091**	0.000	
		3	5.704	1.184**	0.477ns	0.000		
		4	6.181	0.707**	0.000			
		5	6.888	0.000				

[illegible]

TABLE LIII (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
				Table of Newman-Keuls Comparison Between Ordered Means				
"who"	0.13536		Means	7.270	6.792	5.432	4.438	2.900
		1	2.900	4.370**	3.892**	2.532**	1.538**	0.000
		2	4.438	2.832**	2.354**	0.995**	0.000	
		3	5.432	1.838**	1.360**	0.000		
		4	6.792	0.478ns	0.000			
		5	7.270	0.000				
"and"	0.16036		Means	7.944	6.722	5.778	4.387	2.750
		1	2.750	5.194**	3.972**	3.028**	1.637**	0.000
		2	4.387	3.556**	2.335**	1.390**	0.000	
		3	5.778	2.166**	0.944**	0.000		
		4	6.722	1.222**	0.000			
		5	7.944	0.000				
"but"	0.15698		Means	8.753	8.014	7.025	5.762	3.387
		1	3.387	5.365**	4.626**	3.637**	2.375**	0.000
		2	5.762	2.990**	2.251**	1.262**	0.000	
		3	7.025	1.728**	0.989**	0.000		
		4	8.014	0.739**	0.000			
		5	8.753	0.000				

TABLE LIII (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"for"	0.13162		Means	8.101	7.681	6.531	5.550	3.625
		1	3.625	4.476**	4.056**	2.906**	1.925**	0.000
		2	5.550	2.551**	2.131**	0.981**	0.000	
		3	6.531	1.570**	1.150**	0.000		
		4	7.681	0.421ns	0.000			
		5	8.101	0.000				
"yet"	0.13268		Means	6.854	6.361	5.642	4.137	2.425
		1	2.425	4.429**	3.936**	3.217**	1.713**	0.000
		2	4.137	2.716**	2.224**	1.504**	0.000	
		3	5.642	1.212**	0.719**	0.000		
		4	6.361	0.493ns	0.000			
		5	6.854	0.000				
"absent"	0.13649		Means	8.000	7.514	6.457	5.725	3.462
		1	3.462	4.538**	4.051**	2.994**	2.262**	0.000
		2	5.725	2.275**	1.789**	0.732**	0.000	
		3	6.457	1.543**	1.057**	0.000		
		4	7.514	0.486ns	0.000			
		5	8.000	0.000				

TABLE LIII (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
				Table of Newman-Keuls Comparison Between Ordered Means				
"however"	0.14979		Means	6.854	5.917	4.988	3.887	2.587
		1	2.587	4.266**	3.329**	2.400**	1.300**	0.000
		2	3.887	2.966**	2.029**	1.100**	0.000	
		3	4.988	1.866**	0.929**	0.000		
		4	5.917	0.937**	0.000			
		5	6.854	0.000				
"thus"	0.13110		Means	4.270	3.000	2.420	1.962	1.512
		1	1.512	2.757**	1.488**	0.907**	0.450*	0.000
		2	1.962	2.307**	1.038**	0.457*	0.000	
		3	2.420	1.850**	0.580**	0.000		
		4	3.000	1.270**	0.000			
		5	4.270	0.000				
Total Scores (all items)	0.92351		Means	133.393	120.375	104.778	84.675	52.650
		1	52.650	80.743**	67.725**	52.128**	32.025**	0.000
		2	84.675	48.718**	35.700**	20.103**	0.000	
		3	104.778	28.615**	15.597**	0.000		
		4	120.375	13.018**	0.000			
		5	133.393	0.000				

TABLE LIV

NEWMAN-KEULS COMPARISON BETWEEN ORDERED MEANS - GRADE FOUR

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
	Table of Newman-Keuls Comparison Between Ordered Means							
"although"	0.27969		Means	8.000	5.929	4.393	3.481	2.370
		1	2.370	5.630**	3.558**	2.022**	1.111**	0.000
		2	3.481	4.519**	2.447**	0.911*	0.000	
		3	4.393	3.607**	1.536**	0.000		
		4	5.929	2.071**	0.000			
		5	8.000	0.000				
"because"	0.28527		Means	8.000	7.036	6.536	4.926	3.222
		1	3.222	4.778**	3.813**	3.313**	1.704**	0.000
		2	4.926	3.074**	2.110**	1.610**	0.000	
		3	6.536	1.464**	0.500ns	0.000		
		4	7.036	0.964ns	0.000			
		5	8.000	0.000				
"if"	0.24326		Means	8.083	6.536	6.143	4.963	2.481
		1	2.481	5.602**	4.054**	3.661**	2.481**	0.000
		2	4.963	3.120**	1.573**	1.180**	0.000	
		3	6.143	1.940**	0.393ns	0.000		
		4	6.536	1.548**	0.000			
		5	8.083	0.000				

TABLE LIV (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
"so"	0.30259		Means	8.458	7.429	6.571	4.926	3.000
		1	3.000	5.458**	4.429**	3.571**	1.926**	0.000
		2	4.926	3.532**	2.503**	1.646**	0.000	
		3	6.571	1.887**	0.857ns	0.000		
		4	7.429	1.030ns	0.000			
		5	8.458	0.000				
"that" - simple includer	0.19943		Means	4.167	3.714	3.107	2.444	1.444
		1	1.444	2.722**	2.270**	1.663**	1.000**	0.000
		2	2.444	1.722**	1.270**	0.663*	0.000	
		3	3.107	1.060**	0.607ns	0.000		
		4	3.714	0.452ns	0.000			
		5	4.167	0.000				
"when"	0.28385		Means	7.750	6.571	6.000	3.704	2.556
		1	2.556	5.194**	4.016**	3.444**	1.148**	0.000
		2	3.704	4.046**	2.868**	2.296**	0.000	
		3	6.000	1.750**	0.571ns	0.000		
		4	6.571	1.179*	0.000			
		5	7.750	0.000				

[illegible]

TABLE LIV (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
"where"	0.26155		Means	9.792	8.964	7.536	5.741	3.889
		1	3.889	5.903**	5.075**	3.647**	1.852**	0.000
		2	5.741	4.051**	3.224**	1.795**	0.000	
		3	7.536	2.256**	1.429**	0.000		
		4	8.964	0.827ns	0.000			
		5	9.792	0.000				
"that" - relative pronoun	0.31303		Means	10.708	9.000	6.429	4.741	3.444
		1	3.444	7.264**	5.556**	2.984**	1.296**	0.000
		2	4.741	5.968**	4.259**	1.688**	0.000	
		3	6.429	4.280**	2.571**	0.000		
		4	9.000	1.708**	0.000			
		5	10.708	0.000				
"which"	0.24188		Means	6.000	5.571	3.857	2.889	2.111
		1	2.111	3.889**	3.460**	1.746**	0.778*	0.000
		2	2.889	3.111**	2.683**	0.968*	0.000	
		3	3.857	2.143**	1.714**	0.000		
		4	5.571	0.429ns	0.000			
		5	6.000	0.000				

[illegible]

TABLE LIV (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"who"	0.24122		Means	6.917	5.321	4.643	3.296	2.593
		1	2.593	4.324**	2.729**	2.050**	0.704*	0.000
		2	3.296	3.620**	2.025**	1.347**	0.000	
		3	4.643	2.274**	0.679*	0.000		
		4	5.321	1.595**	0.000			
		5	6.917	0.000				
"and"	0.29902		Means	7.208	6.036	4.893	3.926	2.444
		1	2.444	4.764**	3.591**	2.448**	1.481**	0.000
		2	3.926	3.282**	2.110**	0.967ns	0.000	
		3	4.893	2.315**	1.143*	0.000		
		4	6.036	1.173*	0.000			
		5	7.208	0.000				
"but"	0.24802		Means	8.667	7.500	6.286	4.963	3.037
		1	3.037	5.630**	4.463**	3.249**	1.926**	0.000
		2	4.963	3.704**	2.537**	1.323**	0.000	
		3	6.286	2.381**	1.214**	0.000		
		4	7.500	1.167**	0.000			
		5	8.667	0.000				

TABLE LIV (continued)

Scores Grouping acc. Connective	Table of Newman-Keuls Comparison Between Ordered Means							
	Multiplier		Means	5	4	3	2	1
"for"	0.25461		Means	7.917	6.821	5.571	4.741	3.148
		1	3.148	4.769**	3.673**	2.423**	1.593**	0.000
		2	4.741	3.176**	2.081**	0.831ns	0.000	
		3	5.571	2.345**	1.250**	0.000		
		4	6.821	1.095**	0.000			
		5	7.917	0.000				
"yet"	0.22068		Means	6.625	5.571	4.607	3.222	2.000
		1	2.000	4.625**	3.571**	2.607**	1.222**	0.000
		2	3.222	3.403**	2.349**	1.385**	0.000	
		3	4.607	2.018**	0.964*	0.000		
		4	5.571	1.054**	0.000			
		5	6.625	0.000				
"absent"	0.24839		Means	7.625	6.857	5.964	4.593	2.815
		1	2.815	4.810**	4.042**	3.149**	1.778**	0.000
		2	4.593	3.032**	2.265**	1.372**	0.000	
		3	5.964	1.661**	0.893ns	0.000		
		4	6.857	0.768ns	0.000			
		5	7.625	0.000				

TABLE LIV (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"however"	0.27766		Means	5.833	5.357	3.750	2.889	2.667
		1	2.667	3.167**	2.690**	1.083*	0.222ns	0.000
		2	2.889	2.944**	2.468**	0.861ns	0.000	
		3	3.750	2.083**	1.607**	0.000		
		4	5.357	0.476ns	0.000			
		5	5.833	0.000				
"thus"	0.21901		Means	2.750	2.179	1.857	1.704	1.29t
		1	1.296	1.454**	0.882*	0.561ns	0.407ns	0.000
		2	1.704	1.046**	0.475ns	0.153ns	0.000	
		3	1.857	0.893*	0.321ns	0.000		
		4	2.179	0.571ns	0.000			
		5	2.750	0.000				
"total scores" (all items)	1.21133		Means	124.500	106.393	88.143	67.185	44.630
		1	44.630	79.870**	61.763**	43.513**	22.556**	0.000
		2	67.185	57.315**	39.208**	20.958**	0.000	
		3	88.143	36.357**	18.250**	0.000		
		4	106.393	18.107**	0.000			
		5	124.500	0.000				

TABLE LV

NEWMAN-KEULS COMPARISON BETWEEN ORDERED MEANS - GRADE FIVE

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
				Table of Newman-Keuls Comparison Between Ordered Means				
"although"	0.27775		Means	8.741	7.556	6.308	4.481	2.407
		1	2.407	6.333**	5.148**	3.900**	2.074**	0.000
		2	4.481	4.259**	3.074**	1.826**	0.000	
		3	6.308	2.433**	1.248**	0.000		
		4	7.556	1.185*	0.000			
		5	8.741	0.000				
"because:	0.29803		Means	9.111	8.000	6.846	5.778	3.630
		1	3.630	5.481**	4.370**	3.217**	2.148**	0.000
		2	5.778	3.333**	2.222**	1.068*	0.000	
		3	6.846	2.265**	1.154*	0.000		
		4	8.000	1.111ns	0.000			
		5	9.111	0.000				
"if"	0.26325		Means	8.370	7.333	6.692	6.148	3.630
		1	3.630	4.741**	3.704**	3.063**	2.519**	0.000
		2	6.148	2.222**	1.185**	0.544ns	0.000	
		3	6.692	1.678**	0.641ns	0.000		
		4	7.333	1.037*	0.000			
		5	8.370	0.000				

TABLE LV (continued)

Scores Grouping acc. Connective	Multiplier		Table of Newman-Keuls Comparison Between Ordered Means					
			Means	5	4	3	2	1
"so"	0.23902		Means	8.815	8.000	7.308	6.741	3.556
		1	3.556	5.259**	4.444**	3.752**	3.185**	0.000
		2	6.741	2.074**	1.259**	0.567ns	0.000	
		3	7.308	1.507**	0.692ns	0.000		
		4	8.000	0.815*	0.000			
		5	8.815	0.000				
"that" - simple includer	0.17741		Means	4.704	4.259	3.423	3.111	2.037
		1	2.037	2.667**	2.222**	1.386**	1.074**	0.000
		2	3.111	1.593**	1.148**	0.312ns	0.000	
		3	3.423	1.281**	0.836**	0.000		
		4	4.259	0.444ns	0.000			
		5	4.704	0.000				
"when"	0.28071		Means	8.296	7.333	6.115	4.778	2.852
		1	2.852	5.444**	4.481**	3.264**	1.926**	0.000
		2	4.778	3.519**	2.556**	1.338**	0.000	
		3	6.115	2.181**	1.218*	0.000		
		4	7.333	0.963ns	0.000			
		5	8.296	0.000				

[illegible]

TABLE LV (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
"where"	0.27100		Means	10.000	9.296	8.500	7.519	4.037
		1	4.037	5.963**	5.259**	4.463**	3.481**	0.000
		2	7.519	2.481**	1.778**	0.981ns	0.000	
		3	8.500	1.500**	0.796ns	0.000		
		4	9.296	0.704ns	0.000			
		5	10.000	0.000				
"that" - simple includer	0.30064		Means	11.074	10.111	8.192	6.741	4.222
		1	4.222	6.852**	5.889**	3.970**	2.519**	0.000
		2	6.741	4.333**	3.370**	1.452**	0.000	
		3	8.192	2.882**	1.919**	0.000		
		4	10.111	0.963ns	0.000			
		5	11.074	0.000				
"which"	0.24241		Means	7.037	6.111	5.269	3.741	2.259
		1	2.259	4.778**	3.852**	3.010**	1.481**	0.000
		2	3.741	3.296**	2.370**	1.528**	0.000	
		3	5.269	1.768**	0.842ns	0.000		
		4	6.111	0.926ns	0.000			
		5	7.037	0.000				

TABLE LV (continued)

Scores Grouping acc. Connective	Multiplier		Table of Newman-Keuls Comparison Between Ordered Means					
			Means	5	4	3	2	1
"who"	0.24169		Means	7.222	7.037	5.577	4.185	2.926
		1	2.926	4.296**	4.111**	2.651**	1.259**	0.000
		2	4.185	3.037**	2.852**	1.392**	0.000	
		3	5.577	1.645**	1.460**	0.000		
		4	7.037	0.185**	0.000			
		5	7.222	0.000				
"and"	0.27308		Means	8.185	6.963	5.423	4.519	2.296
		1	2.296	5.889**	4.667**	3.127**	2.222**	0.000
		2	4.519	3.667**	2.444**	0.905*	0.000	
		3	5.423	2.762**	1.540**	0.000		
		4	6.963	1.222*	0.000			
		5	8.185	0.000				
"but"	0.30380		Means	8.704	7.852	6.846	5.407	3.185
		1	3.185	5.519**	4.667**	3.661**	2.222**	0.000
		2	5.407	3.296**	2.444**	1.439**	0.000	
		3	6.846	1.858**	1.006ns	0.000		
		4	7.852	0.852ns	0.000			
		5	8.704	0.000				

TABLE [illegible] (Continued)

[illegible]

TABLE LV (continued)

Scores Grouping acc. Connective	Multiplier		Table of Newman-Keuls Comparison Between Ordered Means					
			Means	5	4	3	2	1
"for"	0.23011		Means	8.296	7.407	6.577	5.407	3.667
		1	3.667	4.630**	3.741**	2.910**	1.741**	0.000
		2	5.407	2.889**	2.000**	1.170**	0.000	
		3	6.577	1.719**	0.830ns	0.000		
		4	7.407	0.889*	0.000			
		5	8.296	0.000				
"yet"	0.24246		Means	7.111	6.259	5.615	4.111	2.407
		1	2.407	4.704**	3.852**	3.208**	1.704**	0.000
		2	4.111	3.000**	2.148**	1.504**	0.000	
		3	5.615	1.496**	0.644ns	0.000		
		4	6.259	0.852ns	0.000			
		5	7.111	0.000				
"absent"	0.24054		Means	8.185	7.556	6.308	5.741	3.593
		1	3.593	4.593**	3.963**	2.715**	2.148**	0.000
		2	5.741	2.444**	1.815**	0.567ns	0.000	
		3	6.308	1.877**	1.248**	0.000		
		4	7.556	0.630ns	0.000			
		5	8.185	0.000				

TABLE LV (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"however"	0.26369		Means	6.963	6.333	4.346	4.037	2.407
		1	2.407	4.556**	3.926**	1.939**	1.630**	0.000
		2	4.037	2.926**	2.296**	0.309ns	0.000	
		3	4.346	2.617**	1.987**	0.000		
		4	6.333	0.630ns	0.000			
		5	6.963	0.000				
"thus"	0.23596		Means	4.000	3.037	2.615	1.889	1.778
		1	1.778	2.222**	1.259**	0.838*	0.111ns	0.000
		2	1.889	2.111**	1.148**	0.726ns	0.000	
		3	2.615	1.385**	0.422ns	0.000		
		4	3.037	0.963*	0.000			
		5	4.000	0.000				
total score (all items)	1.39504		Means	134.815	121.778	105.385	84.926	52.074
		1	52.074	82.741**	69.704**	53.311**	32.852**	0.000
		2	84.926	49.889**	36.852**	20.459**	0.000	
		3	105.385	29.430**	16.393**	0.000		
		4	121.778	13.037**	0.000			
		5	134.815	0.000				

TABLE LVI

NEWMAN-KEULS COMPARISON BETWEEN ORDERED MEANS - GRADE SIX

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"although"	0.25103		Means	9.077	8.308	7.800	6.704	4.000
		1	4.000	5.077**	4.308**	3.800**	2.704**	0.000
		2	6.704	2.373**	1.604**	1.096**	0.000	
		3	7.800	1.277**	0.508ns	0.000		
		4	8.308	0.769ns	0.000			
		5	9.077	0.000				
"because"	0.28419		Means	9.192	8.462	8.280	7.370	5.300
		1	5.300	3.892**	3.162**	2.980**	2.070**	0.000
		2	7.370	1.822**	1.091*	0.910ns	0.000	
		3	8.280	0.912ns	0.182ns	0.000		
		4	8.462	0.731ns	0.000			
		5	9.192	0.000				
"if"	0.21228		Means	8.577	7.846	7.120	6.926	4.967
		1	4.967	3.610**	2.879**	2.153**	1.959**	0.000
		2	6.926	1.651**	0.920*	0.194ns	0.000	
		3	7.120	1.457**	0.726ns	0.000		
		4	7.846	0.731ns	0.000			
		5	8.577	0.000				

[illegible]

TABLE LVI (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
				Table of Newman-Keuls Comparison Between Ordered Means				
"so"	0.23488		Means	8.654	8.385	7.960	7.704	5.567
		1	5.567	3.087**	2.818**	2.393**	2.137**	0.000
		2	7.704	0.950*	0.681ns	0.256ns	0.000	
		3	7.960	0.694ns	0.425ns	0.000		
		4	8.385	0.269ns	0.000			
		5	8.654	0.000				
"that" - simple includer	0.15601		Means	4.731	4.346	4.200	4.074	2.633
		1	2.633	2.097**	1.713**	1.567**	1.441**	0.000
		2	4.074	0.657*	0.272ns	0.126ns	0.000	
		3	4.200	0.531ns	0.146ns	0.000		
		4	4.346	0.385ns	0.000			
		5	4.731	0.000				
"when"	0.23369		Means	8.385	7.731	7.360	6.519	4.700
		1	4.700	3.685**	3.031**	2.660**	1.819**	0.000
		2	6.519	1.866**	1.212**	0.841ns	0.000	
		3	7.360	1.025*	0.371ns	0.000		
		4	7.731	0.654ns	0.000			
		5	8.385	0.000				

[illegible]

TABLE LVI (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"where"	0.24568		Means	10.346	10.038	9.360	8.963	6.300
		1	6.300	4.046**	3.738**	3.060**	2.663**	0.000
		2	8.963	1.383**	1.075*	0.397ns	0.000	
		3	9.360	0.986*	0.678ns	0.000		
		4	10.038	0.308ns	0.000			
		5	10.346	0.000				
"that" - relative pronoun	0.25731		Means	11.654	10.615	9.840	8.481	5.933
		1	5.933	5.721**	4.682**	3.907**	2.548**	0.000
		2	8.481	3.172**	2.134**	1.359**	0.000	
		3	9.840	1.814**	0.775ns	0.000		
		4	10.615	1.038*	0.000			
		5	11.654	0.000				
"which"	0.24206		Means	7.385	6.731	6.120	6.000	3.933
		1	3.933	3.451**	2.797**	2.187**	2.067**	0.000
		2	6.000	1.385**	0.731ns	0.120ns	0.000	
		3	6.120	1.265**	0.611ns	0.000		
		4	6.731	0.654ns	0.000			
		5	7.385	0.000				

TABLE LVI (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"who"	0.23645		Means	7.385	7.077	6.640	5.852	4.567
		1	4.567	2.818**	2.510**	2.073**	1.285**	0.000
		2	5.852	1.533**	1.225**	0.788*	0.000	
		3	6.640	0.745ns	0.437ns	0.000		
		4	7.077	0.308ns	0.000			
		5	7.385	0.000				
"and"	0.26295		Means	8.385	7.385	6.320	5.852	3.967
		1	3.967	4.418**	3.418**	2.353**	1.885**	0.000
		2	5.852	2.533**	1.533**	0.468ns	0.000	
		3	6.320	2.065**	1.065*	0.000		
		4	7.385	1.000ns	0.000			
		5	8.385	0.000				
"but"	0.28265		Means	9.231	8.269	7.640	7.222	4.967
		1	4.967	4.264**	3.303**	2.673**	2.256**	0.000
		2	7.222	2.009**	1.047*	0.418ns	0.000	
		3	7.640	1.591**	0.629ns	0.000		
		4	8.269	0.962ns	0.000			
		5	9.231	0.000				

TABLE LVI (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
				Table of Newman-Keuls Comparison Between Ordered Means				
"for"	0.23504		Means	8.385	7.846	7.560	6.259	5.567
		1	5.567	2.818**	2.279**	1.993**	0.693*	0.000
		2	6.259	2.125**	1.587**	1.301**	0.000	
		3	7.560	0.825ns	0.286ns	0.000		
		4	7.846	0.538ns	0.000			
		5	8.385	0.000				
"yet"	0.23278		Means	7.000	6.385	6.440	6.000	3.700
		1	3.700	3.300**	2.685**	2.740**	2.300**	0.000
		2	6.000	1.000*	0.385ns	0.440ns	0.000	
		3	6.440	0.560ns	-0.055ns	0.000		
		4	6.385	0.615ns	0.000			
		5	7.000	0.000				
"absent"	0.23243		Means	8.115	7.846	7.480	6.370	5.133
		1	5.133	2.982**	2.713**	2.347**	1.237**	0.000
		2	6.370	1.745**	1.476**	1.110**	0.000	
		3	7.480	0.635ns	0.366ns	0.000		
		4	7.846	0.269ns	0.000			
		5	8.115	0.000				

TABLE LVI (continued)

Scores Grouping acc. Connective	Multiplier		Means	5	4	3	2	1
			Table of Newman-Keuls Comparison Between Ordered Means					
"however"	0.25685		Means	7.115	6.500	5.800	5.222	4.233
		1	4.233	2.882**	2.267**	1.567**	0.989**	0.000
		2	5.222	1.893**	1.278**	0.578ns	0.000	
		3	5.800	1.315**	0.700ns	0.000		
		4	6.500	0.615ns	0.000			
		5	7.115	0.000				
"thus"	0.21669		Means	4.885	4.346	3.240	2.704	1.967
		1	1.967	2.918**	2.379**	1.273**	0.737*	0.000
		2	2.704	2.181**	1.642**	0.536ns	0.000	
		3	3.240	1.645**	1.106**	0.000		
		4	4.346	0.538ns	0.000			
		5	4.885	0.000				
Total Score (all items)	1.86665		Means	138.500	128.115	120.520	108.222	77.467
		1	77.467	61.033**	50.649**	43.053**	30.756**	0.000
		2	108.222	30.278**	19.893**	12.298**	0.000	
		3	120.520	17.980**	7.595*	0.000		
		4	128.115	10.385**	0.000			
		5	138.500	0.000				

[illegible]

APPENDIX E

INTERCORRELATIONS OF SEVENTEEN CONNECTIVE GROUPS

TABLE LVII

INTERCORRELATIONS OF SEVENTEEN CONNECTIVE GROUPS

Connectives	although	because	if	so	that- (simple incl.)	when
although	1.000	0.679	0.692	0.704	0.650	0.689
because	0.679	1.000	0.672	0.698	0.582	0.679
if	0.692	0.672	1.000	0.699	0.627	0.675
so	0.704	0.698	0.699	1.000	0.620	0.700
that-simple incl.	0.650	0.582	0.627	0.620	1.000	0.619
when	0.689	0.679	0.675	0.700	0.619	1.000
where	0.714	0.712	0.722	0.741	0.633	0.700
that - rel. pro.	0.758	0.725	0.689	0.727	0.633	0.741
which	0.706	0.631	0.626	0.661	0.601	0.672
who	0.681	0.652	0.627	0.661	0.594	0.666
and	0.671	0.661	0.624	0.661	0.636	0.647
but	0.729	0.697	0.679	0.704	0.616	0.672
for	0.668	0.636	0.683	0.683	0.597	0.669
yet	0.713	0.655	0.694	0.682	0.634	0.645
"absent"	0.661	0.676	0.684	0.675	0.604	0.680
however	0.657	0.599	0.553	0.616	0.558	0.650
thus	0.543	0.434	0.491	0.451	0.485	0.470

TABLE LVII (continued)

Connectives	where	that (rel.pro.)	which	who	and	but
although	0.714	0.758	0.706	0.681	0.671	0.729
because	0.712	0.725	0.631	0.652	0.661	0.697
if	0.722	0.689	0.626	0.627	0.624	0.679
so	0.741	0.727	0.661	0.661	0.661	0.704
that (simple incl.)	0.633	0.633	0.601	0.594	0.636	0.616
when	0.700	0.741	0.672	0.666	0.647	0.672
where	1.000	0.748	0.670	0.671	0.682	0.707
that (rel. pro.)	0.748	1.000	0.723	0.718	0.694	0.719
which	0.670	0.723	1.000	0.642	0.665	0.660
who	0.671	0.718	0.642	1.000	0.668	0.648
and	0.682	0.694	0.665	0.668	1.000	0.659
but	0.707	0.719	0.660	0.648	0.659	1.000
for	0.681	0.717	0.658	0.671	0.660	0.632
yet	0.721	0.737	0.653	0.655	0.649	0.671
"absent"	0.713	0.672	0.636	0.637	0.678	0.633
however	0.623	0.655	0.654	0.627	0.599	0.605
thus	0.447	0.492	0.511	0.457	0.473	0.466

TABLE LVII (continued)

Connective	for	yet	"absent"	however	thus
although	0.668	0.713	0.661	0.657	0.543
because	0.636	0.655	0.676	0.599	0.434
if	0.683	0.694	0.684	0.553	0.491
so	0.683	0.682	0.675	0.616	0.451
that (simple includer)	0.597	0.634	0.604	0.558	0.485
when	0.669	0.645	0.680	0.650	0.470
where	0.681	0.721	0.713	0.623	0.447
that (relative pronoun)	0.717	0.737	0.672	0.655	0.492
which	0.658	0.653	0.636	0.654	0.511
who	0.671	0.655	0.637	0.627	0.457
and	0.660	0.649	0.678	0.599	0.473
but	0.632	0.671	0.633	0.605	0.466
for	1.000	0.678	0.672	0.609	0.510
yet	0.678	1.000	0.665	0.608	0.445
"absent"	0.672	0.665	1.000	0.607	0.418
however	0.609	0.608	0.607	1.000	0.512
thus	0.510	0.445	0.418	0.512	1.000

APPENDIX F

CORRELATIONS BETWEEN TOTAL SCORES AND THE SEVENTEEN CONNECTIVE GROUP SCORES ON *CONNECTIVES READING TEST* BY GRADE AND SEX

APPENDIX F

TABLE LVIII

CORRELATIONS BETWEEN TOTAL SCORES AND THE SEVENTEEN CONNECTIVE GROUP SCORES ON CONNECTIVES READING TEST BY GRADE AND SEX (N=67)

Connective Group	Grade	Sex	Correlation Between Total Test Scores and Conn. Grouping	df	Correlated "t" Test Value	Significance*
"although"	4	boys	0.792	66	0.334	ns
	5	boys	0.857	66	0.360	ns
	6	boys	0.830	66	0.411	ns
	4	girls	0.771	66	0.541	ns
	5	girls	0.795	66	0.827	ns
	6	girls	0.839	66	1.124	ns
"because"	4	boys	0.785	66	2.968	**
	5	boys	0.779	66	0.046	ns
	6	boys	0.840	66	1.612	ns
	4	girls	0.781	66	0.042	ns
	5	girls	0.803	66	1.202	ns
	6	girls	0.745	66	0.842	ns
"if"	4	boys	0.787	66	1.471	ns
	5	boys	0.826	66	0.956	ns
	6	boys	0.817	66	1.049	ns
	4	girls	0.834	66	1.400	ns
	5	girls	0.652	66	0.120	ns
	6	girls	0.752	66	3.464	**
"so"	4	boys	0.815	66	0.969	ns
	5	boys	0.845	66	0.578	ns
	6	boys	0.871	66	1.756	ns
	4	girls	0.795	66	1.866	ns
	5	girls	0.710	66	0.220	ns
	6	girls	0.742	66	2.550	*
"that" (simple includer)	4	boys	0.652	66	0.084	ns
	5	boys	0.661	66	0.029	ns
	6	boys	0.730	66	0.908	ns
	4	girls	0.689	66	1.889	ns
	5	girls	0.726	66	0.505	ns
	6	girls	0.668	66	1.827	ns

** significant at the 0.05 level for a two-tailed test

** significant at the 0.01 level for a two-tailed test

ns not significant at the 0.05 level for a two-tailed test

TABLE LVIII (continued)

Connective Group	Grade	Sex	Correlation Between Total Test Scores and Conn. Grouping	df	Correlated "t" Test Value	Significance
"when"	4	boys	0.781	66	2.365	*
	5	boys	0.811	66	0.245	ns
	6	boys	0.842	66	0.886	ns
	4	girls	0.798	66	1.569	ns
	5	girls	0.793	66	2.171	*
	6	girls	0.787	66	2.185	*
"where"	4	boys	0.863	66	2.543	*
	5	boys	0.859	66	1.403	ns
	6	boys	0.855	66	0.445	ns
	4	girls	0.824	66	1.404	ns
	5	girls	0.824	66	3.641	**
	6	girls	0.848	66	2.733	**
"that" (relative pronoun)	4	boys	0.856	66	2.404	*
	5	boys	0.853	66	0.734	ns
	6	boys	0.875	66	2.046	*
	4	girls	0.882	66	0.608	ns
	5	girls	0.835	66	0.575	ns
	6	girls	0.875	66	0.709	ns
"which"	4	boys	0.809	66	2.419	*
	5	boys	0.774	66	0.321	ns
	6	boys	0.809	66	0.641	ns
	4	girls	0.705	66	1.310	ns
	5	girls	0.809	66	1.971	ns
	6	girls	0.707	66	0.056	ns
"who"	4	boys	0.812	66	1.059	ns
	5	boys	0.816	66	1.516	ns
	6	boys	0.716	66	0.261	ns
	4	girls	0.726	66	0.123	ns
	5	girls	0.783	66	1.827	ns
	6	girls	0.702	66	1.179	ns
"and"	4	boys	0.716	66	2.510	*
	5	boys	0.822	66	0.638	ns
	6	boys	0.781	66	0.538	ns
	4	girls	0.779	66	1.757	ns
	5	girls	0.808	66	0.382	ns
	6	girls	0.761	66	3.272	**

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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TABLE LVIII (continued)

Connective Group	Grade	Sex	Correlation Between Total Test Scores and Conn. Grouping	df	Correlated "t" Test Values	Significance
"but"	4	boys	0.818	66	4.035	**
	5	boys	0.807	66	2.084	*
	6	boys	0.783	66	2.746	**
	4	girls	0.855	66	2.922	**
	5	girls	0.698	66	0.353	ns
	6	girls	0.798	66	1.192	ns
"for"	4	boys	0.808	66	1.569	ns
	5	boys	0.821	66	0.163	ns
	6	boys	0.755	66	0.155	ns
	4	girls	0.778	66	1.392	ns
	5	girls	0.758	66	1.024	ns
	6	girls	0.674	66	2.205	*
"yet"	4	boys	0.797	66	2.034	*
	5	boys	0.851	66	0.440	ns
	6	boys	0.821	66	1.005	ns
	4	girls	0.825	66	0.920	ns
	5	girls	0.731	66	0.630	ns
	6	girls	0.678	66	1.784	ns
"absent"	4	boys	0.785	66	0.957	ns
	5	boys	0.756	66	0.045	ns
	6	boys	0.781	66	1.779	ns
	4	girls	0.826	66	2.364	*
	5	girls	0.767	66	0.276	ns
	6	girls	0.715	66	1.926	ns
"however"	4	boys	0.616	66	2.105	*
	5	boys	0.778	66	0.938	ns
	6	boys	0.732	66	0.043	ns
	4	girls	0.701	66	0.638	ns
	5	girls	0.781	66	1.881	ns
	6	girls	0.680	66	1.171	ns
"thus"	4	boys	0.493	66	1.565	ns
	5	boys	0.573	66	2.246	*
	6	boys	0.632	66	1.093	ns
	4	girls	0.297	66	1.345	ns
	5	girls	0.492	66	2.387	*
	6	girls	0.703	66	0.937	ns

APPENDIX G

SUMMARY OF ANALYSIS OF VARIANCE BY GRADE

TABLE LIX

SUMMARY OF ANALYSIS OF VARIANCE - GRADE FOUR

Scores Grouping Test Items	Source of Variance and Sums of Squares: Among means ach. groups	Source of Variance and Sums of Squares: Within ach. groups	Mean Squares: Among means ach. groups	Mean Squares: Within ach. groups	df: Among means ach. groups	df: Within ach. groups	F*
"although"	492.25558	269.57278	123.06	2.09	4	129	58.89
"because"	372.47827	280.44714	93.12	2.17	4	129	42.83
"if"	454.30890	203.92993	113.58	1.58	4	129	71.85
"so"	485.28894	315.52453	121.32	2.45	4	129	49.60
"that" (simple includer)	120.67181	137.05954	30.17	1.06	4	129	28.39
"when"	475.13010	277.65350	118.78	2.15	4	129	55.19
"where"	604.56719	235.73883	151.14	1.83	4	129	82.71
"that" (relative pronoun)	924.48186	337.66742	231.12	2.62	4	129	88.30
"which"	295.01526	201.61908	73.75	1.56	4	129	47.19
"who"	296.97531	200.51724	74.24	1.55	4	129	47.76
"and"	352.18625	308.11975	88.05	2.39	4	129	36.86
"but"	501.75781	211.97357	125.44	1.64	4	129	76.34
"for"	352.84857	223.39026	88.21	1.73	4	129	50.94
"yet"	351.25470	167.82739	87.81	1.30	4	129	67.50
"absent"	382.70300	212.61047	95.68	1.65	4	129	58.05
"however"	214.71695	265.67859	53.68	2.06	4	129	26.06
"thus"	30.22741	165.29498	7.56	1.28	4	129	5.90
Total Scores (all test items)	103078.95	5056.4843	25769.74	39.20	4	129	657.43

* For each F in this table, the $p < .001$

TABLE LX

SUMMARY OF ANALYSIS OF VARIANCE - GRADE FIVE

Scores Grouping Test Items	Source of Variance and Sums of Squares: Among means ach. groups.	Source of Variance and Sums of Squares: Within ach. groups	Mean Squares: Among means ach. groups	Mean Squares: Within ach. groups	df: Among Means ach. groups	df: Within ach. groups	F*
"although"	679.88768	266.64966	169.97	2.07	4	129	82.23
"because"	480.53790	307.01434	120.13	2.38	4	129	50.48
"if"	339.35705	239.53851	84.84	1.86	4	129	45.69
"so"	438.62512	197.46448	109.66	1.53	4	129	71.64
"that" (simple includer)	116.70192	108.79062	29.18	0.84	4	129	34.60
"when"	496.48572	272.35760	124.12	2.11	4	129	58.79
"where"	587.74877	253.83337	146.94	1.97	4	129	74.67
"that" (relative pronoun)	803.98669	312.40894	201.00	2.42	4	129	83.00
"which	390.97415	203.11542	97.74	1.57	4	129	62.08
"who"	367.91913	201.90179	91.98	1.57	4	129	58.77
"and"	555.67925	257.75360	138.92	2.00	4	129	69.53
"but"	511.02307	319.01428	127.76	2.47	4	129	51.66
"for"	351.31549	183.01288	87.83	1.42	4	129	61.91
"yet"	374.54791	203.19092	93.64	1.58	4	129	59.45
"absent"	344.80066	199.98297	86.20	1.55	4	129	55.60
"however"	365.37240	240.32910	91.34	1.86	4	129	49.03
"thus"	89.43791	192.45015	22.36	1.49	4	129	14.99
Total Scores (all test items)	114,428.27	6,726.6249	28,607.07	52.14	4	129	548.61

* For each F in this table, the $p < .001$

TABLE LXI

SUMMARY OF ANALYSIS OF VARIANCE - GRADE SIX

Scores Grouping Test Items	Source of Variance and Sums of Squares		Mean Squares		df		F*
	Among means ach. groups	Within ach. groups	Among means ach. groups	Within ach. groups	Among means ach. groups	Within ach. groups	
"although"	444.23944	217.01434	111.06	1.68	4	129	66.02
"because"	256.66961	278.13641	64.17	2.16	4	129	29.76
"if"	207.74347	155.18939	51.94	1.20	4	129	43.17
"so"	172.43054	189.99487	43.11	1.47	4	129	29.27
"that" (simple includer)	73.91281	83.81854	18.48	0.65	4	129	28.44
"when"	229.51202	188.07007	57.38	1.46	4	129	39.36
"where"	296.22778	207.86926	74.06	1.61	4	129	45.96
"that" (relative pronoun)	552.94934	228.00598	138.24	1.77	4	129	78.21
"which"	192.10467	201.77594	48.03	1.56	4	129	30.70
"who"	144.33905	192.53412	36.08	1.49	4	129	24.18
"and"	312.33343	238.12183	78.08	1.85	4	129	42.30
"but"	286.69671	275.12420	71.67	2.13	4	129	33.61
"for"	152.14514	190.25043	38.04	1.47	4	129	25.79
"yet"	189.77417	186.61389	47.44	1.45	4	129	32.80
"absent"	171.21228	186.04150	42.80	1.44	4	129	29.68
"however"	139.59637	227.18726	34.90	1.76	4	129	19.82
"thus"	155.89477	161.69478	38.97	1.25	4	129	31.09
Total Scores (all test items)	62,737.547	11,999.547	15,684.39	93.02	4	129	168.61

* For each F in this table, the $p < .001$

APPENDIX H

SUMMARY OF ANALYSIS OF VARIANCE FOR THREE-FACTOR EXPERIMENT

SUMMARY OF ANALYSIS OF VARIANCE FOR THREE-FACTOR EXPERIMENT

The tables in this appendix show the two sources of variation, that "between subjects" and that "within subjects." The "between subjects" variation gives the effects of the factors of sex and grade and the effect of their interaction on student performance on the test. The variation among the students who made up these various sex and grade groups was tallied. Variance ratios ("F_s") were then computed and the probabilities of their significance or non-significance occurring by chance were recorded for a one-tailed test. However, as both ends of the performance curve were important, the significance of the "F_s" was indicated as for a two-tailed test (by doubling the probability figures).

The "within subjects" source of variation identified the effects of the student performance on all the items of the test and on one of the groupings of test items by a connective (C), as well as the interaction between sex and student performance (AC), and that between grade and student performance (BC). The interaction of the three factors, ABC, was also computed. Variance ratios for the effects of factor C, and the interactions AC, BC, and ABC were then computed.

"**" means significant at the 0.01 level and "*" at the 0.05 level. No significance at the 0.05 level is indicated by "ns." Using standard scores there was a non-variant level resulting in no between group variance. The negative sums of squares resulted from rounding errors.

TABLE LXII

SUMMARY OF ANALYSIS OF VARIANCE FOR THREE-FACTOR EXPERIMENT

Sources of Variation	Sums of Squares	Degrees of Freedom	Mean Squares		F	P
1. Analysis using "although" connective test items: (Factor C_{part})						
Bet. Subj.	74459.421	401.				
A	4888.1562	1.	4888.1562	**	33.70	0.0000
B	11127.765	2.	5563.8827	**	38.35	0.0000
AB	997.1250	2.	498.5625	ns	3.44	0.0331
Subj. W Group	57446.375	396.	145.0666			
Within Subj.	5942.7500	402.				
C	-0.7344	1.	-0.7344	**	-0.05	0.0000
AC	12.5625	1.	12.5625	ns	0.84	0.3594
BC	11.5625	2.	5.7813	ns	0.39	0.6794
ABC	12.0313	2.	6.0156	ns	0.40	0.6689
C X Subj. W G	5907.3437	396.	14.9175			
2. Analysis using "because" connective test items: (Factor C_{part})						
Bet. Subj.	73251.608	401.				
A	4535.2187	1.	4535.2187	**	30.75	0.0000
B	9471.4374	2.	4735.7187	**	32.11	0.0000
AB	845.6562	2.	422.8281	ns	2.87	0.0580
Subj. W Group	58399.297	396.	147.4730			
Within Subj.	7151.4374	402.				
C	-0.5938	1.	-0.5938	**	-0.03	0.0000
AC	37.3906	1.	37.3906	ns	2.14	0.1441
BC	139.3125	2.	69.6562	*	3.99	0.0192
ABC	62.4062	2.	31.2031	ns	1.79	0.1686
C X Subj. W.G.	6912.9374	396.	17.4569			
3. Analysis using "if" connective test items: (Factor C_{part})						
Bet. Subj.	73047.937	401.				
A	4501.8750	1.	4501.8750	**	30.42	0.0000
B	8841.9843	2.	4420.9922	**	29.88	0.0000
AB	1109.1406	2.	554.5703	*	3.75	0.0244
Subj. W Group	58594.937	396.	147.9670			
Within Subj.	7349.8749	402.				
C	-0.5156	1.	-0.5156	**	-0.03	0.0000
AC	40.4688	1.	40.4688	ns	2.27	0.1331
BC	222.5156	2.	111.2578	**	6.23	0.0022
ABC	12.4375	2.	6.2188	ns	0.35	0.7067
C X Subj. W. G.	7074.9843	396.	17.8661			

TABLE LXII (continued)

Sources of Variation	Sums of Squares	Degrees of Freedom	Mean Squares		F	P
4. Analysis using "so" connective test items: (Factor C_{part})						
Bet. Subj.	73763.983	401.				
A	5210.2031	1.	5210.2031	**	35.24	0.0000
B	9015.1406	2.	4507.5703	**	30.49	0.0000
AB	994.6406	2.	497.3203	ns	3.36	0.0355
Subj. W Group	58543.999	396.	147.8383			
Within Subj.	6635.5625	402.				
C	-0.7500	1.	-0.7500	**	-0.05	0.0000
AC	1.6250	1.	1.6250	ns	0.10	0.7521
BC	186.1875	2.	93.0937	**	5.73	0.0035
ABC	19.0625	2.	9.5313	ns	0.59	0.5569
C X Subj. W. G.	6429.4531	396.	16.2360			
5. Analysis using the "that" (simple includer) connective test items: (Factor C_{part})						
Bet. Subj.	70132.061	401.				
A	5947.7500	1.	5947.7500	**	44.08	0.0000
B	9584.8593	2.	4792.4297	**	35.52	0.0000
AB	1163.1094	2.	581.5547	*	4.31	0.0141
Subj. W Group	53436.343	396.	134.9402			
Within Subj.	10272.484	402.				
C	-0.7500	1.	-0.7500	**	0.03	0.0000
AC	13.3750	1.	13.3750	ns	0.52	0.4694
BC	117.0469	2.	58.5234	ns	2.30	0.1019
ABC	49.7969	2.	24.8984	ns	0.98	0.3776
C X Subj W. G.	10093.016	396.	25.4874			
6. Analysis using the "when" connective test items: (Factor C_{part})						
Bet Subj.	73442.359	401.				
A	4351.4062	1.	4351.4062	**	29.04	0.0000
B	8930.9530	2.	4465.4765	**	29.80	0.0000
AB	821.1562	2.	410.5781	ns	2.74	0.0657
Subj. W Group	59338.843	396.	149.8456			
Within Subj.	6952.1562	402.				
C	-0.5469	1.	-0.5469	**	0.03	0.0000
AC	56.1875	1.	56.1875	ns	3.35	0.0679
BC	241.4688	2.	120.7344	**	7.20	0.0009
ABC	10.9688	2.	5.4844	ns	0.33	0.7218
C X Subj. W G	6644.0937	396.	16.7780			

TABLE LXII (continued)

Sources of Variation		Sums of Squares	Degree of Freedom	Mean Squares		F	P
7.	Analysis using the "where" connective test items: (Factor C_{part})						
	Bet. Subj.	74901.015	401.				
	A	3824.9687	1.	3824.9687	**	24.77	0.0000
	B	9288.9843	2.	4644.4922	**	30.08	0.0000
	AB	647.8906	2.	323.9453	ns	2.10	0.1239
	Subj. W Group	61139.172	396.	154.3919			
	Within Subj.	5497.5156	402.				
	C	-0.7031	1.	-0.7031	**	-0.05	0.0000
	AC	134.8281	1.	134.8281	**	10.41	0.0014
	BC	175.8906	2.	87.9453	**	6.79	0.0013
	ABC	57.2813	2.	28.6406	ns	2.21	0.1109
	C X Subj. W G	5130.2344	396.	12.9551			
8.	Analysis using the "that" (relative pronoun) connective test items: (Factor C_{part})						
	Bet. Subj.	75744.296	401.				
	A	4715.1875	1.	4715.1875	**	31.11	0.0000
	B	10217.281	2.	5108.6406	**	33.71	0.0000
	AB	796.0937	2.	398.0469	ns	2.63	0.0735
	Subj. W Group	60015.734	396.	151.5549			
	Within Subj.	4646.8750	402.				
	C	-0.7500	1.	-0.7500	**	0.07	0.0000
	AC	22.9531	1.	22.9531	ns	2.02	0.1564
	BC	56.5156	2.	28.2578	ns	2.48	0.0848
	ABC	59.3750	2.	29.6875	ns	2.61	0.0749
	C X Subj. W G	4508.7812	396.	11.3858			
9.	Analysis using the "which" connective test items: (Factor C_{part})						
	Bet. Subj.	72821.921	401.				
	A	3849.5000	1.	3849.5000	**	26.98	0.0000
	B	11611.594	2.	5805.7968	**	40.70	0.0000
	AB	866.6250	2.	433.3125	ns	3.04	0.0490
	Subj. W Group	56494.202	396.	142.6621			
	Within Subj.	7572.7655	402.				
	C	-0.6406	1.	-0.6406	**	-0.03	0.0000
	AC	130.3125	1.	130.3125	*	7.00	0.0085
	BC	25.6563	2.	12.8281	ns	0.69	0.5028
	ABC	49.1094	2.	24.5547	ns	1.32	0.2684
	C X Subj. W G	7368.3281	396.	18.6069			

TABLE LXII (continued)

Sources of Variation	Sums of Squares	Degree of Freedom	Mean Squares		F	P
10. Analysis using the "who" connective test items: (Factor C_{part})						
Bet. Subj.	72692.171	401.				
A	3970.4219	1.	3970.4219	**	27.56	0.0000
B	10937.047	2.	5468.5234	**	37.96	0.0000
AB	734.2031	2.	367.1016	ns	2.55	0.0794
Subj. W Group	57050.499	396.	144.0669			
Within Subj.	7708.0468	402.				
C	-0.4375	1.	-0.4375	**	-0.02	0.0000
AC	109.1562	1.	109.1563	*	5.72	0.0172
BC	15.6875	2.	7.8437	ns	0.41	0.6637
ABC	26.4375	2.	13.2188	ns	0.69	0.5012
C X Subj. W G	7557.2187	396.	19.0839			
11. Analysis using the "and" connective test items: (Factor C_{part})						
Bet. Subj.	72537.468	401.				
A	4505.3281	1.	4505.3281	**	30.53	0.0000
B	8165.8280	2.	4082.9140	**	27.67	0.0000
AB	1433.9531	2.	716.9766	*	4.86	0.0082
Subj. W Group	58432.359	396.	147.5564			
Within Subj.	7863.8437	402.				
C	-0.7500	1.	-0.7500	**	-0.04	0.0000
AC	40.1563	1.	40.1563	ns	2.14	0.1444
BC	343.3750	2.	171.6875	**	9.14	0.0001
ABC	43.3438	2.	21.6719	ns	1.15	0.3166
C X Subj. W G	7437.7187	396.	18.7821			
12. Analysis using the "but" connective test items: (Factor C_{part})						
Bet. Subj.	73207.186	401.				
A	6016.5156	1.	6016.5156	**	40.79	0.0000
B	7674.9686	2.	3837.4843	**	26.02	0.0000
AB	1106.4062	2.	553.2031	*	3.75	0.0243
Subj. W Group	58409.297	396.	147.4982			
Within Subj.	7208.2968	402.				
C	-0.9063	1.	-0.9063	**	-0.05	0.0000
AC	16.8281	1.	16.8281	ns	1.01	0.3148
BC	549.5000	2.	274.7500	**	16.54	0.0000
ABC	64.2031	2.	32.1016	ns	1.93	0.1461
C X Subj. W G	6578.6719	396.	16.6128			

TABLE LXII (continued)

Sources of Variation	Sums of Squares	Degree of Freedom	Mean Squares		F	P
13. Analysis using the "for" connective test items: (Factor C_{part})						
Bet. Subj.	72890.686	401.				
A	4581.7656	1.	4581.7656	**	31.38	0.0000
B	9393.9062	2.	4696.9531	**	32.17	0.0000
AB	1102.4844	2.	551.2421	*	3.78	0.0237
Subj. W Group	57812.531	396.	145.9912			
Within Subj.	7512.3906	402.				
C	-0.5313	1.	-0.5313	**	-0.03	0.0000
AC	33.3281	1.	33.3281	ns	1.80	0.1801
BC	142.1406	2.	71.0703	*	3.84	0.0222
ABC	15,7656	2.	7.8828	ns	0.43	0.6537
C X Subj. W G	7321.7030	396.	18.4891			
14. Analysis using the "yet" connective test items: (Factor C_{part})						
Bet. Subj.	73468.546	401.				
A	4626.7500	1.	4626.7500	**	31.30	0.0000
B	9340.1405	2.	4670.0703	**	31.59	0.0000
AB	964.7187	2.	482.3594	ns	3.26	0.0392
Subj. W Group	58536.937	396.	147.8206			
Within Subj.	6923.5780	402.				
C	-0.4375	1.	-0.4375	**	-0.03	0.0000
AC	29.5469	1.	29.5469	ns	1.73	0.1888
BC	140.8906	2.	70.4453	*	4.13	0.0167
ABC	0.9531	2.	0.4766	ns	-0.03	0.9720
C X Subj. W G	6752.6249	396.	17.0521			
15. Analysis using the "absent" connective test items: (Factor C_{part})						
Bet. Subj.	72880.531	401.				
A	5750.3749	1.	5750.3749	**	39.80	0.0000
B	8873.8749	2.	4436.9375	**	30.71	0.0000
AB	1035.6875	2.	517.8438	ns	3.58	0.0286
Subj. W Group	57220.593	396.	144.4965			
Within Subj.	7527.4687	402.				
C	-0.6094	1.	-0.6094	**	-0.03	0.0000
AC	5.6094	1.	5.6094	ns	0.30	0.5819
BC	205.3281	2.	102.6640	**	5.56	0.0042
ABC	8.2031	2.	4.1016	ns	0.22	0.8012
C X Subj. W G	7308.9374	396.	18.4569			

TABLE LXII (continued)

Source of Variation	Sums of Squares	Degree of Freedom	Mean Squares		F	P
16. Analysis using the "however" connective test items: (Factor C_{part})						
Bet. Subj.	70787.233	401.				
A	3575.8750	1.	3575.8750	**	25.26	0.0000
B	10355.234	2.	5177.6171	**	36.57	0.0000
AB	788.2187	2.	394.1094	ns	2.78	0.0630
Subj. W Group	56067.906	396.	141.5856			
Within Subj.	9610.0624	402.				
C	-0.7344	1.	-0.7344	**	-0.03	0.0000
AC	186.6407	1.	186.6407	**	7.91	0.0052
BC	56.1719	2.	28.0859	ns	1.19	0.3051
ABC	28.5313	2.	14.2656	ns	0.60	0.5470
C X Subj. W G	9339.4687	396.	23.5845			
17. Analysis of "thus" connective test items: (Factor C_{part})						
Bet. Subj.	64204.077	401.				
A	2377.6719	1.	2377.6719	**	19.03	0.0000
B	11864.000	2.	5932.0000	**	47.47	0.0000
AB	482.2031	2.	241.1016	ns	1.93	0.1465
Subj. W Group	49480.203	396.	124.9500			
Within Subj.	16186.469	402.				
C	-0.7188	1.	-0.7188	**	-0.02	0.0000
AC	610.0937	1.	610.0937	**	15.60	0.0001
BC	1.2188	2.	.6094	ns	0.02	0.9839
ABC	89.6094	2.	44.8047	ns	1.15	0.3191
C X Subj. W G	15486.281	396.	39.1068			

APPENDIX I

TESTS FOR SIGNIFICANCE OF INTERACTIONS

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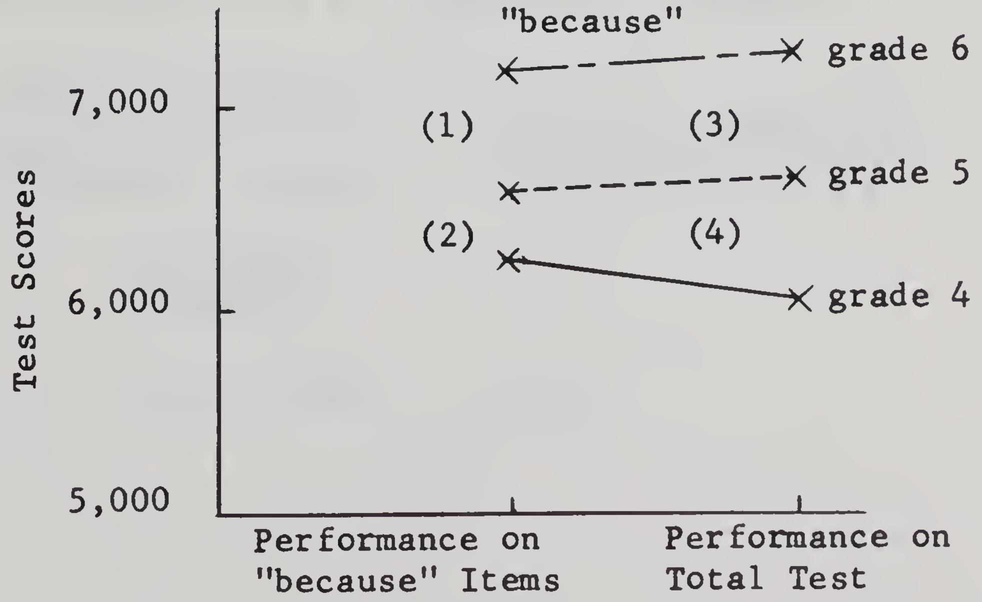
TESTS FOR SIGNIFICANCE OF GRADE AND
CONNECTIVES READING TEST INTERACTIONS (FACTOR BC)

For each of the interactions undergoing tests of significance, a minimum of four tests each were done. Two of the tests, those which tested the differences between performances on the total test at various grade levels were common to each set of connective grouping such as the "because" items. The remaining two tests involved the use of test scores on particular connective groups and therefore, were unique to that interaction.

The tests for the "because" test items will serve as an example for the other connective interactions which will be reported in a summary table.



The first tests of significance between the students' performance on the "because" items and their performance at grades 4, 5, and 6 levels.

a. Between grades 5 and 4. (Position 2 on Graph)

$$F = \frac{(BC_{5part} - BC_{4part})^2}{2npMS_{error\ (within)}} = \frac{(6659.92 - 6221.50)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(438.42)^2}{39546.08} =$$

$$F_{.99}(2,396) = 4.86$$

$$p < .01$$

b. Between grades 6 and 5. (Position 1 on Graph)

$$F = \frac{(BC_{6part} - BC_{5part})^2}{2npMS_{error\ (within)}} = \frac{(7218.49 - 6659.92)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(558.57)^2}{39546.08} =$$

$$F_{.99}(2,396) = 7.89$$

$$p < .01$$

The second tests of significance were between the students' performance on the total test and their performance at grades 4, 5 and 6 levels.

a. Between grades 5 and 4. (Position 4 on Graph)

$$F = \frac{(BC_{5total} - BC_{4total})^2}{2npMS_{error\ (within)}} = \frac{(6709.90 - 6067.25)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(642.65)^2}{39546.08} =$$

$$F_{.99}(2,396) = 10.44$$

$$p < .01$$

b. Between grades 6 and 5. (Position 3 on Graph)

$$F = \frac{(BC_{6total} - BC_{5total})^2}{2npMS_{error\ (within)}} = \frac{(7322.81 - 6709.90)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(612.91)^2}{39546.08} =$$

$$F_{.99}(2,396) = 9.50$$

$$p < .01$$

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TABLE LXIII

SUMMARY OF TESTS OF SIGNIFICANCE OF GRADE AND
CONNECTIVES READING TEST INTERACTIONS (FACTOR BC)

Test Scores on Items Testing:	Interaction Between: Grades	F Ratio*	P
"if"	5 and 4	$F = \frac{(6752.52 - 6213.80)^2}{(2)(67)(2)(147.56)} = 7.34$	$p < .01$
	6 and 5	$F = \frac{(7132.51 - 6752.52)^2}{(2)(67)(2)(147.56)} = 3.65$	$p > .05$
"so"	5 and 4	$F = \frac{(6727.22 - 6215.56)^2}{(2)(67)(2)(147.56)} = 6.62$	$p < .01$
	6 and 5	$F = \frac{(7157.27 - 6727.22)^2}{(2)(67)(2)(147.56)} = 4.68$	$p < .02$
"when"	5 and 4	$F = \frac{(6622.93 - 6273.86)^2}{(2)(67)(2)(147.56)} = 3.08$	$p > .05$
	6 and 5	$F = \frac{(7203.13 - 6622.93)^2}{(2)(67)(2)(147.56)} = 8.51$	$p < .01$
"where"	5 and 4	$F = \frac{(6639.84 - 6242.88)^2}{(2)(67)(2)(147.56)} = 3.99$	$p > .05$
	6 and 5	$F = \frac{(7216.97 - 6639.84)^2}{(2)(67)92)(147.56)} = 8.42$	$p < .01$

* d.f. (num.) = 2
d.f. (denom.) = 396

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TABLE LXIII (continued)

Test Scores on Items Testing:	Interaction Between: Grades	F Ratio	P
"and"	5 and 4	$F = \frac{(6659.89 - 6302.28)^2}{(2)(67)(2)(147.56)} = 3.23$	$p > .05$
	6 and 5	$F = \frac{(7138.16 - 6659.89)^2}{(2)(67)(2)(147.56)} = 5.78$	$p < .02$
"but"	5 and 4	$F = \frac{(6578.70 - 6379.36)^2}{(2)(67)(2)(147.56)} = 1.01$	$p < .05$
	6 and 5	$F = \frac{(7142.80 - 6578.70)^2}{(2)(67)(2)(147.56)} = 8.05$	$p < .01$
"for"	5 and 4	$F = \frac{(6671.73 - 6220.31)^2}{(2)(67)(2)(147.56)} = 5.15$	$p < .02$
	6 and 5	$F = \frac{(7208.43 - 6671.73)^2}{(2)(67)(2)(147.56)} = 7.28$	$p < .01$
"yet"	5 and 4	$F = \frac{(6698.35 - 6209.89)^2}{(2)(67)(2)(147.56)} = 6.03$	$p < .02$
	6 and 5	$F = \frac{(7191.76 - 6698.35)^2}{(2)(67)(2)(147.56)} = 6.16$	$p < .02$
"absent"	5 and 4	$F = \frac{(6719.96 - 6227.83)^2}{(2)(67)(2)(147.56)} = 6.12$	$p < .02$
	6 and 5	$F = \frac{(7152.58 - 6719.96)^2}{(2)(67)(2)(147.56)} = 4.73$	$p < .02$

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[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	
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[illegible]	[illegible]	[illegible]	

TESTS FOR SIGNIFICANCE OF GRADE AND SEX INTERACTIONS (FACTOR AB)

For the test items of "if"

$$F = \frac{(AB_{f4} - AB_{m4})^2}{2nr\ MS_{error\ (between)}} = \frac{(6459.72 - 5821.33)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(638.39)^2}{39,546.08}$$

$$F_{.99}(2,396) = 10.31$$

$$p < .01$$

$$F = \frac{(AB_{f5} - AB_{m5})^2}{2nr\ MS_{error\ (between)}} = \frac{(7239.99 - 6222.43)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(1017.56)^2}{39,546.08}$$

$$F_{.99}(2,396) = 26.18$$

$$p < .01$$

$$F = \frac{(AB_{f6} - AB_{m6})^2}{2nr\ MS_{error\ (between)}} = \frac{(7350.93 - 7104.39)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(246.54)^2}{39,546.08}$$

$$F_{.99}(2,396) = 1.54$$

$$p > .05$$

For the test items of "that-simple includer"

$$F = \frac{(AB_{f4} - AB_{m4})^2}{2nr\ MS_{error\ (between)}} = \frac{(6513.67 - 5731.08)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(782.59)^2}{39,546.08}$$

$$F_{.99}(2,396) = 15.49$$

$$p < .01$$

(continued)

$$F = \frac{(AB_{f5} - AB_{m5})^2}{2nr\ MS_{error\ (between)}} = \frac{(7269.55 - 6175.41)^2}{(2)(67)(2)(147.56)} = \frac{(1094.14)^2}{39,546.08}$$

$$F_{.99}(2,396) = 30.27$$

$$p < .01$$

$$F = \frac{(AB_{f6} - AB_{m6})^2}{2nr\ MS_{error\ (between)}} = \frac{7410.03 - 7099.98)^2}{(2)(67)(2)(147.56)} = \frac{(310.05)^2}{39,546.08}$$

$$F_{.99}(2,396) = 2.43$$

$$p > .05$$

For the test items of "and"

$$F = \frac{(AB_{f4} - AB_{m4})^2}{2nr\ MS_{error\ (between)}} = \frac{(6485.74 - 5883.79)^2}{(2)(67)(2)(147.56)} = \frac{(601.95)^2}{39,546.08}$$

$$F_{.99}(2,396) = 9.16$$

$$p < .01$$

$$F = \frac{(AB_{f5} - AB_{m5})^2}{2nr\ MS_{error\ (between)}} = \frac{(7228.94 - 6140.85)^2}{(2)(67)(2)(147.56)} = \frac{(1088.09)^2}{39,546.08}$$

$$F_{.99}(2,396) = 29.94$$

$$p < .01$$

TESTS FOR SIGNIFICANCE OF GRADE AND SEX INTERACTIONS (FACTOR AB)

(continued)

$$F = \frac{(AB_{f6} - AB_{m6})^2}{2nr\ MS_{error\ (between)}} = \frac{(7337.08 - 7123.89)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(213.19)^2}{39,546.08}$$

$$F_{.99}(2,396) = 1.15$$

$$p > .05$$

For the test items of "but"

$$F = \frac{(AB_{f4} - AB_{m4})^2}{2nr\ MS_{error\ (between)}} = \frac{(6520.07 - 5926.54)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(593.53)^2}{39,546.08}$$

$$F_{.99}(2,396) = 8.91$$

$$p < .01$$

$$F = \frac{(AB_{f5} - AB_{m5})^2}{2nr\ MS_{error\ (between)}} = \frac{(7228.55 - 6060.05)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(1168.50)^2}{39,546.08}$$

$$F_{.99}(2,396) = 34.53$$

$$p < .01$$

$$F = \frac{(AB_{f6} - AB_{m6})^2}{2nr\ MS_{error\ (between)}} = \frac{(7451.48 - 7014.13)^2}{(2)(67)(2)(147.56)} =$$

$$\frac{(437.35)^2}{39,546.08}$$

$$F_{.99}(2,396) = 4.84$$

$$p < .05$$

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(continued)

For the connective "for" test items:

$$F = \frac{(AB_{f4} - AB_{m4})^2}{2nr\ MS_{error\ (between)}} = \frac{(6469.61 - 5817.95)^2}{(2)(67)(2)(147.56)} = \frac{(651.66)^2}{39,546.08}$$

$$F_{.99}(2,396) = 10.74$$

$$p < .01$$

$$F = \frac{(AB_{f5} - AB_{m5})^2}{2nr\ MS_{error\ (between)}} = \frac{(7199.84 - 6181.79)^2}{(2)(67)(2)(147.56)} = \frac{(1018.05)^2}{39,546.08}$$

$$F_{.99}(2,396) = 26.21$$

$$p < .01$$

$$F = \frac{(AB_{f6} - AB_{m6})^2}{2nr\ MS_{error\ (between)}} = \frac{(7390.42 - 7140.82)^2}{(2)(67)(2)(147.50)} = \frac{(249.60)^2}{39,546.08}$$

$$F_{.99}(2,396) = 1.58$$

$$p > .05$$

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TESTS FOR SEX AND CONNECTIVE READING TEST

PERFORMANCE INTERACTIONS

(FACTOR AC)

For the test items of "where":

$$F = \frac{(AC_{fpart} - AC_{mpart})^2}{2nq\ MS_{error\ (within)}} = \frac{(10405.90 - 9693.77)^2}{(2)(67)(3)(147.56)} =$$

$$\frac{(712.13)^2}{59,319.12}$$

$$F_{.99}(1,396) = 8.55$$

$$p < .01$$

$$F = \frac{(AC_{ftotal} - AC_{mtotal})^2}{2nq\ MS_{error\ (within)}} = \frac{(10570.73 - 9529.23)^2}{(2)(67)(3)(147.56)} =$$

$$\frac{(1041.50)^2}{59,319.12}$$

$$F_{.99}(1,396) = 18.29$$

$$p < .01$$

For the test items of "which";

$$F = \frac{(AC_{fpart} - AC_{mpart})^2}{2nq\ MS_{error\ (within)}} = \frac{(10409.08 - 9691.33)^2}{(2)(67)(3)(147.56)} =$$

$$\frac{(717.75)^2}{59,319.12}$$

$$F_{.99}(1,396) = 8.68$$

$$p < .01$$

The F tests using the C_{total} are the same for each connective.

TESTS FOR SEX AND CONNECTIVE READING TEST

PERFORMANCE INTERACTIONS (FACTOR AC)

(continued)

For the test items of "who":

$$F = \frac{(AC_{fpart} - AC_{mpart})^2}{2nq\ MS_{error\ (within)}} = \frac{(10422.51 - 9677.34)^2}{(2)(67)(3)(147.56)} =$$

$$\frac{(745.17)^2}{59,319.12}$$

$$F_{.99}(1,396) = 9.36$$

$$p < .01$$

For the test items of "however":

$$F = \frac{(AC_{fpart} - AC_{mpart})^2}{2nq\ MS_{error\ (within)}} = \frac{(10377.35 - 9723.28)^2}{(2)(67)(3)(147.56)} =$$

$$\frac{(654.07)^2}{59,319.12}$$

$$F_{.99}(1,396) = 7.21$$

$$p < .01$$

For the test items of "thus":

$$F = \frac{(AC_{fpart} - AC_{mpart})^2}{2nq\ MS_{error\ (within)}} = \frac{(10220.69 - 9879.58)^2}{(2)(67)(3)(147.56)} =$$

$$\frac{(341.11)^2}{59,319.12}$$

$$F_{.99}(1,396) = 1.96$$

$$p > .05$$

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APPENDIX J

SUMMARY OF STUDENT ACHIEVEMENT ON THE TEST ITEMS OF THE <u>WRITTEN CONNECTIVES TEST</u>

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TABLE LXIV

SUMMARY OF STUDENT ACHIEVEMENT ON THE TEST ITEMS OF THE WRITTEN CONNECTIVES TEST

Grade	Sex	Population Strata	Number of Students	Percentage of Acceptable Answers on Test Items
4 - 6	Boys and Girls	Urban	201	67.68
		Small Town	48	63.54
		Rural	145	58.34
	Total		394	63.74
	Boys	Urban	99	63.44
		Small Town	24	65.00
		Rural	71	51.48
	Total		194	59.25
	Girls	Urban	102	71.81
		Small Town	24	62.50
		Rural	74	64.93
	Total		200	68.10

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[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]		[illegible]	

TABLE LXV

SUMMARY OF STUDENT ACHIEVEMENT ON THE TEST ITEMS OF THE WRITTEN CONNECTIVES TEST (BY GRADE AND SEX)

Grade	Sex	Population Strata	Number of Students	Percentage of Acceptable Answers on Test Items
4	Boys and Girls	Urban	66	64.47
		Small Town	16	51.25
		Rural	50	52.80
	Total		132	58.44
	Boys	Urban	32	59.22
		Small Town	8	44.38
		Rural	25	48.20
	Total		65	53.15
	Girls	Urban	34	69.41
		Small Town	8	58.13
		Rural	25	57.40
	Total		67	63.58
5	Boys and Girls	Urban	68	66.32
		Small Town	16	67.50
		Rural	46	56.52
	Total		130	63.00
	Boys	Urban	34	61.32
		Small Town	8	75.00
		Rural	21	47.62
	Total		63	58.49
	Girls	Urban	34	71.32
		Small Town	8	60.00
		Rural	25	64.00
	Total		67	67.24
6	Boys and Girls	Urban	67	72.24
		Small Town	16	71.88
		Rural	49	65.71
	Total		132	69.77
	Boys	Urban	33	69.57
		Small Town	8	75.63
		Rural	25	58.00
	Total		66	65.99
	Girls	Urban	34	74.71
		Small Town	8	68.13
		Rural	24	73.75
	Total		66	73.56

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TABLE LXVI

ACHIEVEMENT OF GRADE FOUR STUDENTS ON SELECTED ITEMS OF THE WRITTEN CONNECTIVES TEST (BY POPULATION STRATA AND SEX)

			ITEM NUMBERS						
Grade	Population Strata	Sex	13 "although"	10 "because"	20 "because"	1 "if"	15 "so"	9 "when"	11 "where"
4	Urban	Boys = 32	31.25*	75.00	84.37	93.75	75.00	75.00	81.25
		Girls = 34	50.00	85.29	82.35	94.11	91.17	88.23	85.29
		N = 66	40.90	80.30	83.33	93.93	83.33	81.81	83.33
	Small Town	Boys = 8	12.50	37.50	62.50	37.50	62.50	37.50	100.00
		Girls = 8	25.00	87.50	62.50	75.00	62.50	75.00	87.50
		N = 16	18.75	62.50	62.50	56.25	62.50	56.25	93.75
	Rural	Boys = 25	16.00	60.00	72.00	76.00	72.00	60.00	68.00
		Girls = 25	12.00	76.00	84.00	68.00	68.00	76.00	92.00
		N = 50	14.00	68.00	78.00	72.00	70.00	68.00	80.00
Total by Sex		Boys = 65	23.07	64.61	76.92	80.00	72.30	64.61	78.46
		Girls = 67	32.83	82.08	80.59	82.08	79.10	82.08	88.05
Total by Grade		N = 132	28.03	73.48	78.78	81.06	75.75	73.48	83.33

* per cent of acceptable answers.

TABLE LXVI (continued)

Grade	Population Strata	Sex	ITEM NUMBERS 18 "and"	16 "but"	19 "but"	12 "for"	17 "yet"	14 "who"	5 "thus"
4	Urban	Boys = 32	43.75*	68.75	78.13	87.50	46.88	50.00	93.75
		Girls = 34	55.88	82.35	79.41	82.35	44.12	50.00	85.29
		N = 66	50.00	75.76	78.79	84.85	45.45	50.00	89.39
	Small Town	Boys = 8	37.50	75.00	50.00	75.00	37.50	37.50	62.50
		Girls = 8	50.00	75.00	50.00	100.00	50.00	50.00	37.50
		N = 16	43.75	75.00	50.00	87.50	43.75	43.75	50.00
	Rural	Boys = 25	44.00	60.00	44.00	84.00	40.00	24.00	68.00
		Girls = 25	64.00	76.00	72.00	84.00	48.00	52.00	60.00
		N = 50	54.00	68.00	58.00	84.00	44.00	38.00	64.00
Total by Sex		Boys = 65	43.08	66.15	61.54	84.62	43.08	38.46	80.00
		Girls = 67	58.21	79.10	73.13	85.07	46.27	50.75	70.15
Total by Grade		N = 132	50.76	72.73	67.42	84.85	44.70	44.70	75.00

* per cent of acceptable answers.

TABLE LXVI (continued)

			ITEM NUMBERS					
Grade	Popula-tion Strata	Sex	4 "although-that"	7 "but-which"	3 "that-and-because"	8 "that-where"	2 "that-which"	6 "when-that"
4	Urban	Boys = 32	50.00*	00.00	3.12	59.37	40.62	46.87
		Girls = 34	76.47	2.94	29.41	85.29	64.70	73.52
		N = 66	63.63	1.51	16.66	72.72	53.03	60.60
	Small Town	Boys = 8	37.50	00.00	12.50	50.00	37.50	25.00
		Girls = 8	75.00	00.00	37.50	87.50	25.00	50.00
		N = 16	56.25	00.00	25.00	68.75	31.25	37.50
	Rural	Boys = 25	40.00	00.00	00.00	64.00	36.00	36.00
		Girls = 25	56.00	00.00	8.00	76.00	36.00	40.00
		N = 50	48.00	00.00	4.00	70.00	36.00	38.00
Total by Sex		Boys = 65	44.61	00.00	3.07	60.00	38.46	40.00
		Girls = 67	68.65	1.49	22.38	82.08	49.25	58.20
Total by Grade		N = 132	56.81	0.75	12.87	71.21	43.93	49.24

* per cent of acceptable answers.

TABLE LXVII

ACHIEVEMENT OF GRADE FIVE STUDENTS ON SELECTED ITEMS OF THE WRITTEN CONNECTIVES TEST
(BY POPULATION STRATA AND SEX)

Grade	Population Strata	Sex	ITEM NUMBERS 13 "although"	10 "because"	20 "because"	1 "if"	15 "so"	9 "when"	11 "where"
5	Urban	Boys = 34	23.52*	70.58	79.41	94.11	70.58	94.11	88.23
		Girls = 34	47.05	97.05	88.23	91.17	61.76	91.17	97.05
		N = 68	35.29*	83.82	83.82	92.64	66.17	92.64	92.64
	Small Town	Boys = 8	62.50	75.00	100.00	100.00	87.50	87.50	75.00
		Girls = 8	50.00	100.00	75.00	75.00	87.50	87.50	100.00
		N = 16	56.25	87.50	87.50	87.50	87.50	87.50	87.50
	Rural	Boys = 21	19.04	61.90	61.90	80.95	52.38	76.19	76.19
		Girls = 25	28.00	80.00	92.00	76.00	88.00	84.00	96.00
		N = 46	23.91	71.73	78.26	78.26	71.73	80.43	86.95
Total by Sex		Boys = 63	26.98	68.25	76.19	90.47	66.66	87.30	82.53
		Girls = 67	40.29	91.04	88.05	83.58	74.62	88.05	97.01
Total by Grade		N = 130	33.84	80.00	82.30	86.92	70.76	87.69	90.00

* per cent of acceptable answers.

TABLE LXVII (continued)

Grade	Population Strata	Sex	ITEM NUMBERS 18 "and"	16 "but"	19 "but"	12 "for"	17 "yet"	14 "who"	5 "thus"
5	Urban	Boys = 34	47.06*	67.65	73.53	82.35	64.71	55.88	88.24
		Girls = 34	61.76	73.53	91.18	79.41	64.71	70.59	85.29
		N = 68	54.41	70.59	82.35	80.88	64.71	63.24	86.76
	Small Town	Boys = 8	50.00	62.50	87.50	87.50	100.00	87.50	100.00
		Girls = 8	12.50	75.00	62.50	87.50	37.50	37.50	87.50
		N = 16	31.25	68.75	75.00	87.50	68.75	62.56	93.75
	Rural	Boys = 21	38.10	47.62	42.86	76.19	23.81	28.57	80.95
		Girls = 25	52.00	64.00	72.00	68.00	48.00	60.00	80.00
		N = 46	45.65	56.52	58.70	71.74	36.96	45.65	80.43
Total by Sex		Boys = 63	44.44	60.32	65.08	80.95	55.56	50.79	87.30
		Girls = 67	52.24	70.15	80.60	76.12	55.22	62.69	83.58
Total by Grade		N = 130	48.46	65.38	73.08	78.46	55.38	56.92	85.38

* per cent of acceptable answers.

TABLE LXVII (continued)

Grade	Population Strata	Sex	ITEM NUMBERS 4 "although-that"	7 "but-which"	3 "that-and-because"	8 "that-where"	2 "that-which"	6 "when-that"
5	Urban	Boys = 34	55.88*	00.00	11.76	64.70	38.20	55.88
		Girls = 34	70.58	00.00	32.35	88.23	58.82	76.47
		N = 68	63.23	00.00	22.05	76.47	48.52	66.17
	Small Town	Boys = 8	75.00	00.00	00.00	100.00	62.50	100.00
		Girls = 8	37.50	00.00	25.00	75.00	37.50	50.00
		N = 16	56.25	00.00	12.50	87.50	50.00	75.00
	Rural	Boys = 21	33.33	00.00	14.28	66.67	33.33	38.09
		Girls = 25	72.00	00.00	24.00	84.00	56.00	56.00
		N = 46	54.35	00.00	19.57	76.09	45.65	47.83
Total by Sex		Boys = 63	50.79	00.00	11.11	69.84	39.68	55.56
		Girls = 67	67.16	00.00	28.36	85.07	55.22	65.67
Total By Grade		N = 130	59.23	00.00	20.00	77.69	47.69	60.77

* per cent of acceptable answers

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

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TABLE LXVIII

ACHIEVEMENT OF GRADE SIX STUDENTS ON SELECTED ITEMS OF THE WRITTEN CONNECTIVES TEST
(BY POPULATION STRATA AND SEX)

			ITEM NUMBERS						
Grade	Population Strata	Sex	13 "although"	10 "because"	20 "because"	1 "if"	15 "so"	9 "when"	11 "where"
6	Urban	Boys = 33	39.40*	78.79	87.88	88.23	87.88	84.85	87.88
		Girls = 34	47.05	91.17	94.11	82.35	85.29	94.11	97.05
		N = 67	43.28	85.07	91.04	86.56	86.56	89.55	92.53
	Small Town	Boys = 8	62.50	100.00	100.00	87.50	87.50	87.50	100.00
		Girls = 8	25.00	75.00	87.50	100.00	100.00	75.00	75.00
		N = 16	43.75	87.50	93.75	93.75	93.75	81.25	87.50
	Rural	Boys = 25	56.00	72.00	92.00	88.00	68.00	84.00	88.00
		Girls = 24	54.16	91.66	87.50	100.00	83.33	95.83	87.50
		N = 49	55.10	81.63	89.79	93.87	75.51	87.79	87.75
Total by Sex		Boys = 66	48.48	78.79	90.91	89.39	80.30	84.85	89.39
		Girls = 66	46.96	89.39	90.91	90.91	86.36	92.42	90.91
Total by Grade		N = 132	47.72	84.09	90.91	90.15	83.33	88.63	90.15

* per cent of acceptable answers.

TABLE LXVIII (continued)

Grade	Population Strata	Sex	ITEM NUMBERS 18 "and"	16 "but"	19 "but"	12 "for"	17 "yet"	14 "who"	5 "thus"
6	Urban	Boys = 33	66.67*	78.79	93.94	84.85	54.55	69.70	90.91
		Girls = 34	82.35	85.29	94.12	88.24	58.82	64.71	91.18
		N = 67	74.63	82.09	94.03	86.57	56.72	67.16	91.04
	Small Town	Boys = 8	62.50	87.50	87.50	75.00	50.00	75.00	100.00
		Girls = 8	50.00	87.50	100.00	87.50	50.00	75.00	100.00
		N = 16	56.25	87.50	93.75	81.25	50.00	75.00	100.00
	Rural	Boys = 25	44.00	60.00	80.00	84.00	36.00	44.00	80.00
		Girls = 24	50.00	75.00	87.50	75.00	87.50	79.17	87.50
		N = 49	46.94	67.35	83.67	79.59	61.22	61.22	83.67
Total by Sex		Boys = 66	57.58	72.73	87.88	83.33	46.97	60.61	87.88
		Girls = 66	66.67	81.82	92.42	83.33	68.18	71.21	90.91
Total by Grade		N = 132	62.12	77.27	90.15	83.33	57.58	65.91	89.39

* per cent of acceptable answers.

TABLE LXVIII (continued)

Grade	Population Strata	Sex	ITEM NUMBERS 4 "although-that"	7 "but-which"	3 "that-and-because"	8 "that-where"	2 "that-which"	6 "when-that
6	Urban	Boys = 33	72.73*	3.03	15.15	78.79	48.49	78.79
		Girls = 34	76.47	14.71	35.29	91.18	50.00	70.58
		N = 67	74.63	8.96	25.37	85.08	49.25	74.63
	Small Town	Boys = 8	87.50	12.50	12.50	100.00	50.00	87.50
		Girls = 8	75.00	00.00	37.50	87.50	12.50	62.50
		N = 16	81.25	6.25	25.00	93.75	31.25	75.00
	Rural	Boys = 25	52.00	00.00	4.00	60.00	32.00	36.00
		Girls = 24	79.17	00.00	29.17	95.83	58.33	70.83
		N = 49	65.31	00.00	16.33	77.55	44.90	53.06
Total by Sex		Boys = 66	66.67	3.03	10.61	74.24	42.42	63.64
		Girls = 66	77.27	7.58	33.33	92.42	48.49	69.70
Total by Grade		N = 132	71.97	5.30	21.97	83.33	45.46	66.67

* per cent of acceptable answers

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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TABLE LXIX

STUDENT ACHIEVEMENT ON SELECTED ITEMS OF THE WRITTEN CONNECTIVES TEST
(BY POPULATION STRATA AND SEX)

Population Strata	Number of Students	Sex	ITEM NUMBERS 13 "although"	10 "because"	20 "because"	1 "if"	15 "so"	9 "when"	11 "where"
Urban	201	Boys = 99	31.31*	74.75	83.84	92.92	77.78	84.84	85.86
		Girls = 102	48.03	91.17	88.23	89.21	79.41	91.17	93.13
		N = 201	39.80	83.08	86.06	91.04	78.60	88.05	89.55
Small Town	48	Boys = 24	45.83	70.83	87.50	75.00	79.16	70.83	91.66
		Girls = 24	33.33	87.50	75.00	87.50	87.50	79.16	87.50
		N = 48	39.58	79.16	81.25	79.16	81.25	75.00	89.58
Rural	145	Boys = 71	30.98	64.78	76.05	81.69	64.78	73.23	77.46
		Girls = 74	31.08	82.43	87.83	81.08	79.72	85.13	91.89
		N = 145	31.03	73.79	82.06	81.37	72.41	79.31	84.82
Total	394	Boys = 194	32.98	70.61	81.44	86.59	73.19	78.86	83.50
		Girls = 200	40.00	87.50	86.50	85.50	80.00	87.50	92.00
		N = 394	36.54	79.18	84.01	86.04	76.64	83.24	87.81

* per cent of acceptable answers.

[illegible]

[illegible]

TABLE LXIX (continued)

Population Strata	Number of Students	Sex	ITEM NUMBERS 18 "and"	16 "but"	19 "but"	12 "for"	17 "yet"	14 "who"	5 "thus"
Urban	201	Boys = 99	52.53*	71.72	81.82	84.85	55.56	58.59	90.91
		Girls = 102	66.67	80.39	88.24	83.33	55.88	61.76	87.25
		N = 201	59.70	76.12	85.07	84.08	55.72	60.20	89.05
Small Town	48	Boys = 24	50.00	75.00	75.00	79.17	62.50	66.67	87.50
		Girls = 24	37.50	79.17	70.83	91.67	45.83	54.17	75.00
		N = 48	43.75	77.08	72.92	85.42	54.17	60.42	81.25
Rural	145	Boys = 71	42.25	56.34	56.34	81.69	33.80	32.39	76.06
		Girls = 74	55.41	71.62	77.03	75.68	60.81	63.51	75.68
		N = 145	48.97	64.14	66.90	78.62	47.59	48.28	75.86
Total	394	Boys = 194	48.45	66.49	71.65	82.99	48.45	50.00	85.05
		Girls = 200	59.00	77.00	82.00	81.50	56.50	61.50	81.50
		N = 394	53.81	71.83	76.90	82.23	52.54	55.84	83.25

* per cent of acceptable answers.

TABLE LXIX (continued)

Population Strata	Number of Students	Sex	ITEM NUMBERS 4 "although' that"	7 "but-which"	3 "that-and-because"	8 "that-where"	2 "that-which"	6 "when-that"
Urban	201	Boys = 99	59.60*	1.01	10.10	67.68	42.42	60.61
		Girls = 102	74.51	5.88	32.35	88.24	57.84	73.53
		N = 201	67.16	3.48	21.39	78.11	50.25	67.16
Small Town	48	Boys = 24	66.67	4.17	8.33	83.33	50.00	70.83
		Girls = 24	62.50	0.00	33.33	83.33	25.00	54.17
		N = 48	64.58	2.08	20.83	83.33	37.50	62.50
Rural	145	Boys = 71	42.25	0.00	5.63	63.38	33.80	36.62
		Girls = 74	68.92	0.00	20.27	85.14	50.00	55.41
		N = 145	55.86	0.00	13.10	74.48	42.07	46.21
Total	394	Boys = 194	54.12	1.03	8.25	68.04	40.21	53.10
		Girls = 200	71.00	3.00	28.00	86.50	51.00	64.50
		N = 394	62.68	2.03	18.27	77.41	45.69	58.88

* per cent of acceptable answers.

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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